APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP – 0290 – 10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Phoenix Controls (a business of Honeywell International, Inc.)

Manufacturer's Technical Representative: Lloyd Le, Engineering Manager, Honeywell – Connected Building

Mailing Address: 75 Discovery Way, Acton, MA 01720

Telephone: (978) 795-3442 Email: Lloyd.le@honeywell.com

Product Information

Product Name: Accel II Airflow Control Valves

Product Type: Mechanical Equipment

Product Model Number: See attachments
(List all unique product identification numbers and/or part numbers)

General Description: Airflow control valves featuring various controllers, actuators and additional options as specified in attachments. 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: Horizontal in-line duct mounted (ceiling suspended) and vertical in-line duct mounted

Applicant Information

Applicant Company Name: The VMC Group

Contact Person: John 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: 2/8/19

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: Kenneth Tarlow California License Number: SE-2851

Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

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

Supports and Attachments Preapproval

☐ Supports and attachments are preapproved under OPM- _____
(Separate application for OSHPD Preapproval of Manufacturer's Certification (OPM) of Supports and attachments is required)

☒ Supports and attachments are not preapproved

Certification Method

☐ Testing in accordance with: ☒ ICC-ES AC156

☐ Other (Please Specify): _____

Testing Laboratory

Company Name: DCL Labs

Contact Name: Josh Sailer, Laboratory Manager

Mailing Address: 1315 Greg Street, Suite 109, Sparks, NV 89431

Telephone: (775) 358-5085 Email: josh@shaketest.com

Seismic Parameters

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

Design Basis of Equipment or Components (F_p/W_p) = 1.88

S_{DS} (Design spectral response acceleration at short period, g) = 2.5

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

R_p (Equipment or component response modification factor) = 6.0

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = 1.0

Equipment or Component Natural Frequencies (Hz) = See attachments

Overall dimensions and weight (or range thereof) = See attachments

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

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

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

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

R (Response modification coefficient) =

Ω_0 (System overstrength factor) =

C_d (Deflection amplification factor) =

I_p (Importance factor) = 1.5

Height to Center of Gravity above base =

Equipment or Component Natural Frequencies (Hz) =

Overall dimensions and weight (or range thereof) =

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

List of Attachments Supporting Special Seismic Certification

☒ Test Report(s) ☐ Drawings ☐ Calculations ☒ Manufacturer's Catalog

☐ Other(s) (Please Specify):

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

Signature: Date: July 28, 2019

Print Name: Ali Sumer Title: DSE

Special Seismic Certification Valid Up to : S_{DS} (g) = 2.5 z/h = 1.0

Condition of Approval (if applicable):

Table 1- Certified Components, Constant Volume - Horizontal Orientation

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Mounting Description: Horizontal in-line duct mounted (ceiling suspended)

DCL Dynamic Certification Laboratories

Valve Family	Model Number	Valve Body	Diameter (in)	Dimensions (in)			Weight (lb)	Max. Hanger Rod Spacing (in)	Sds (g), z/h=1	Connection Type [1]	Unit
				Depth	Width	Height					
CSV/CEV Constant Volume	CSVA108M-ACNHZ	Single	8	23.5	7.9	12.0	6	48	2.5	NF	UUT1a
	CSVA108M-ACNHZ	Single	8				8			DB	UUT1b
	CSVA108M-ACNHZ-SFB	Single	8				8			SF	UUT1c
	CxVxx08x-ACNxZ	Single	8	23.5 to 30.0	7.9 to 14.0	12.0 to 19.5	6 to 16			NF, DB, SF, WF [2]	Interpolated
	CxVxx08x-ACNxZ-SFB	Single	8							NF, DB, SF, WF [2]	Interpolated
	CxVxx10x-ACNxZ	Single	10							NF, DB, SF, WF [2]	Interpolated
	CxVxx10x-ACNxZ-SFB	Single	10							NF, DB, SF, WF [2]	Interpolated
	CxVxx12x-ACNxZ	Single	12							NF, DB, SF, WF [2]	Interpolated
	CxVxx12x-ACNxZ-SFB	Single	12							NF, DB, SF, WF [2]	Interpolated
	CxVxx14x-ACNxZ	Single	14							NF, DB, SF, WF [2]	Interpolated
	CxVxx14x-ACNxZ-SFB	Single	14							NF, DB, SF, WF [2]	Interpolated
	CSVA114M-ACNHZ	Single	14	30.0	14.0	19.5	12			NF	UUT3a
	CSVA114M-ACNHZ	Single	14				15			DB	UUT3b
	CSVA114M-ACNHZ-SFB	Single	14				16			SF	UUT3c
	CSVA210M-ACNHZ	Dual	10	24.0	20.0	14.0	18			SF	UUT4
	CxVx210x-ACNxZ	Dual	10	24.0 to 33.0	20.0 to 30.0	14.0 to 18.5	18 to 33			SF	Interpolated
	CxVx212x-ACNxZ	Dual	12							SF	Interpolated
	CxVx214x-ACNxZ	Dual	14							SF	Interpolated
	CSVA214M-ACNHZ	Dual	14	33.0	30.0	18.5	33			SF	UUT2

Notes:

1. No Flange (NF) , No Flange with Drawband Clamps (DB) , Square Flange (SF), Welded Flange (WF)
2. Welded Flange (WF) connection type tested in UUT 9

Table 2- Certified Components, Variable Volume - Horizontal Orientation

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Mounting Description: Horizontal in-line duct mounted (ceiling suspended)

Valve Family	Model Number	Valve Body	Diamter (in)	Dimensions (in)			Weight (lb)	Max. Hanger Rod Spacing (in)	Sds (g), z/h=1	Connection Type [2]	Unit
				Depth	Width	Height					
PSV/PEV Pneumatic[1]	PxVxx08x-xxxxx-xxx	Single	8	23.5 to 33.0	10.3 to 30.0	14.6 to 20.5	9 to 49	48	2.5	NF, DB, SF, WF	Extrapolated
	PxVxx10x-xxxxx-xxx	Single	10							NF, DB, SF, WF	Extrapolated
	PxVxx12x-xxxxx-xxx	Single	12							NF, DB, SF, WF	Extrapolated
	PxVxx14x-xxxxx-xxx	Single	14							NF, DB, SF, WF	Extrapolated
	PxVx210x-xxxxx-xxx	Dual	10							SF	Extrapolated
	PxVx212x-xxxxx-xxx	Dual	12							SF	Extrapolated
	PxVx214x-xxxxx-xxx	Dual	14							SF	Extrapolated
BSV/BEV Base Upgradeable[1]	BxVxx08x-xxxxx-xxx	Single	8	23.5 to 33.0	10.3 to 30.0	14.6 to 20.5	9 to 49	48	2.5	NF, DB, SF, WF	Extrapolated
	BxVxx10x-xxxxx-xxx	Single	10							NF, DB, SF, WF	Extrapolated
	BxVxx12x-xxxxx-xxx	Single	12							NF, DB, SF, WF	Extrapolated
	BxVxx14x-xxxxx-xxx	Single	14							NF, DB, SF, WF	Extrapolated
	BxVx210x-xxxxx-xxx	Dual	10							SF	Extrapolated
	BxVx212x-xxxxx-xxx	Dual	12							SF	Extrapolated
	BxVx214x-xxxxx-xxx	Dual	14							SF	Extrapolated
MAV/EXV Analog / Celeris	EXVA108M-AMEHO	Single	8	23.5	10.3	14.6	9	48	2.5	NF	UUT5a
	EXVA108M-AMEHO	Single	8				11			DB	UUT5b
	EXVA108M-ALEHZ-SFB	Single	8				11			SF	UUT5c
	EXVA108M-AIEHZ-SFB	Single	8				11			SF	UUT5d
	EXVDF08M-AAEHO-PSL / EXVDF08M-AAHHO	Single	8	23.5	10.3	14.6	17			WF	UUT9
	MAV/EXVxx08x-xxxxx-xxx	Single	8	23.5 to 30.0	10.3 to 13.9	14.6 to 21.4	9 to 20			NF, DB, SF, WF	Interpolated
	MAV/EXVxx10x-xxxxx-xxx	Single	10							NF, DB, SF, WF	Interpolated
	MAV/EXVxx12x-xxxxx-xxx	Single	12							NF, DB, SF, WF	Interpolated
	MAV/EXVxx14x-xxxxx-xxx	Single	14							NF, DB, SF, WF	Interpolated
	EXVA114M-AMEHO	Single	14	30.0	13.9	21.4	20			NF	UUT6a
	EXVA114M-AMEHO	Single	14	30.0	13.9	21.4	23			DB	UUT6b
	EXVB114M-SMEHO	Single	14	30.0	13.9	21.4	24			SF	UUT10
	EXVA210M-AMEHC	Dual	10	25.0	20.0	16.5	30			SF	UUT7a
	EXVA210M-ANEHO	Dual	10				30			SF	UUT7b
	EXVA210M-ANEHC	Dual	10				30			SF	UUT7c
	EXVA210M-AEEHC	Dual	10				30			SF	UUT7d
	MAV/EXVx210x-xxxxx-xxx	Dual	10	25.0 to 33.0	20.0 to 30.0	16.5 to 20.5	30 to 49			SF	Interpolated
	MAV/EXVx212x-xxxxx-xxx	Dual	12							SF	Interpolated
	MAV/EXVx214x-xxxxx-xxx	Dual	14							SF	Interpolated
	EXVA214M-AMEHC	Dual	14	33.0	30.0	20.5	49			SF	UUT8a

Notes:

1. PSV/PEV and BSV/BEV are depopulated units from the MAV/EXV valve families
2. No Flange (NF) , No Flange with Drawband Clamps (DB) , Square Flange (SF) , Welded Flange (WF)

Table 2- Certified Components, Variable Volume - Horizontal Orientation (Continued)

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Mounting Description: Horizontal in-line duct mounted (ceiling suspended)

Valve Family	Model Number	Valve Body	Diamter (in)	Dimensions (in)			Weight (lb)	Max. Hanger Rod Spacing (in)	Sds (g), z/h=1	Connection Type [2]	Unit
				Depth	Width	Height					
HSV/HEV Theris[1]	HxVxx08x-xxxxx-xxx	Single	8	23.5 to 30.0	10.3 to 13.9	14.6 to 21.4	9 to 24	48	2.5	NF, DB, SF, WF [3]	Extrapolated
	HxVxx10x-xxxxx-xxx	Single	10							NF, DB, SF, WF [3]	Extrapolated
	HxVxx12x-xxxxx-xxx	Single	12							NF, DB, SF, WF [3]	Extrapolated
	HxVxx14x-xxxxx-xxx	Single	14							NF, DB, SF, WF [3]	Extrapolated
	HSVA114M-ALOHZ-SFB	Single	14	30.0	13.9	21.4	24			SF	UUT6c
	HxVx210x-xxxxx-xxx	Dual	10	25.0 to 33.0	20.0 to 30.0	16.5 to 20.5	30 to 49			SF	Interpolated
	HxVx212x-xxxxx-xxx	Dual	12							SF	Interpolated
	HxVx214x-xxxxx-xxx	Dual	14							SF	Interpolated
TSV/TEV Traccel[1]	TxVxx08x-xxxxx-xxx	Single	8	23.5 to 30.0	10.3 to 13.9	14.6 to 21.4	9 to 24	48	2.5	NF, DB, SF, WF [3]	Extrapolated
	TxVxx10x-xxxxx-xxx	Single	10							NF, DB, SF, WF [3]	Extrapolated
	TxVxx12x-xxxxx-xxx	Single	12							NF, DB, SF, WF [3]	Extrapolated
	TxVxx14x-xxxxx-xxx	Single	14							NF, DB, SF, WF [3]	Interpolated
	TxVx210x-xxxxx-xxx	Dual	10	25.0 to 33.0	20.0 to 30.0	16.5 to 20.5	30 to 49			SF	Interpolated
	TxVx212x-xxxxx-xxx	Dual	12							SF	Interpolated
	TxVx214x-xxxxx-xxx	Dual	14							SF	Interpolated
	TSVA214M-ALXHZ	Dual	14	33.0	30.0	20.5	49			SF	UUT8b

Notes:

1. HSV/HEV and TSV/TEV valves are similar to the MAV/EXV valve families, and ony differ by the type of controller (Theris controller tested in UUT6c and Traccel controller tested in UUT8b).
2. No Flange (NF) , No Flange with Drawband Clamps (DB) , Square Flange (SF), Welded Flange (WF)
3. No Flange with Drawband Clamps (DB) Tested in UUT 1b, 3b, 6b, welded Flange (WF) Tested in UUT 9

Table 3- Certified Subcomponents - Horizontal Orientation

Mounting Description: Horizontal in-line duct mounted (ceiling suspended)

Subcomponent [MFR]	Model Number	Description	Appoximate Weight (lbs)	Sds (g), z/h=1	Unit
Controller Board [PHOENIX CONTROLS] Material: PCB	C2V LOSEA	Low Speed	0.5	2.5	UUT5c-d
	THERIS	Low Speed	0.5		UUT6c
	TRACCEL	Low Speed	0.5		UUT8b
	LVC HISEA	High Speed	0.7		UUT5a-b, 6a-b, 7a, 8a, 10
	AVC HISEA	High Speed Analog	0.7		UUT7d
	C2V PNU	Pneumatic	0.7		UUT7b-c
	VLV CNTRL ANALOG	Pneumatic Analog	0.7		UUT9
Actuator [PHOENIX CONTROLS] Material: galvanized carbon steel	Integral Part of Valve	Manual Control Actuator	0.5	2.5	UUT1a-c, 2, 3a-c, 4
Actuator [PHOENIX CONTROLS] Material: plastic and carbon steel	490-000-073	High Speed Electric Linear Actuator	2.6	2.5	UUT5b, 6a, 7d
	490-000-092	High Speed Electric Linear Actuator	2.6		Same as UUT5b, 6a, 7d
	490-000-095	Medium Speed Electric Linear Actuator	2.6		Same as UUT5b, 6a, 7d
Actuator [THOMSON] Material: plastic and carbon steel	DH12-17W41	High Speed Electric Linear Actuator	1.9	2.5	UUT8a
	DH12-17W42	High Speed Electric Linear Actuator	1.9		UUT5a, 6b, 7a, 10
Actuator [BELIMO] Material: plastic and carbon steel	GMB24-3 PH	On/Off Floating Point Control, Non-Spring Return, Direct Coupled, 24 V	2.5	2.5	UUT8b
	GMB24-SR	Proportional Control, Non-Spring Return, Direct Coupled, 24 V	2.5		Same as UUT8b
	AMQBX24-MFT	Programable, Non-Spring Return, Direct Coupled, 24 V	2.7		Interpolated[1]
	AMB24-3.1 PH	On/Off Floating Point Control, Non-Spring Return, 24 V	2.7		UUT6c
	AMB24-SR	Proportional Control, Non-Spring Return, 24 V	2.7		Same as UUT6c
	NMQBX24-MFT	Programable, Non-Spring Return, 24 V	4.5		Same as UUT6c
	NMB24-3.1 PH	On/Off Floating Point Control, Non-Spring Return, Direct Coupled, 24 V	4.6		UUT5d
	NMB24-SR	Proportional Control, Non-Spring Return, Direct Coupled, 24 V	4.6		Same as UUT5d
Actuator [HONEYWELL] Material: plastic and carbon steel	ML6174B2019	On/Off Floating Point Control, Non-Spring Return Damper Actuator, 24 V	2.8	2.5	UUT5c
	ML7174A2001	Proportional Control, Non-Spring Return Damper Actuator, 24 V	2.9		Same as UUT5c
Actuator [KMC] Material: plastic and carbon steel	MCP-0335	3" Pneumatic Control Actuator (Open/Closed Position)	2.7	2.5	UUT7c, 9
	MCP-0435	4" Pneumatic Control Actuator (Open/Closed Position)	3.6		UUT7b
Pressure switch [HONEYWELL] Material: plastic and carbon steel	1227D1/A, 0.30" WC PF	Pressure Switch	0.2	2.5	UUT9

Notes:

1. Same as controller tested in UUT8b, except slightly smaller and with software change.

Table 4 - Options - Horizontal Orientation

Mounting Description: Horizontal in-line duct mounted (ceiling suspended)

Nomenclature: AAA B C DD E - F G H I J - xxx					
Nomenclature	**Property**	**Allowable Value**	**Allowable Value Description**	**Sds (g), z/h=1**	**Unit**
AAA	Valve Family	CSV/CEV	Constant Volume	2.5	UUT1-4
		PSV/PEV	Pneumatic		Interpolated[1]
		BSV/BEV	Base Upgradeable		Interpolated[1]
		MAV/EXV	Analog		UUT7d, 9
		MAV/EXV	Celeris		UUT5, 6a-b, 7a-c, 8a, 10
		HSV/HEV	Theris		UUT6c
		TSV/TEV	Traccel		UUT8b
B	Valve Construction	A	Body and cone - uncoated aluminum; shaft - uncoated 316 SS	2.5	UUT1-8
		B	Body and cone with baked phenolic coating; PFA-coated 316 SS shaft		UUT10
		C	Body, cone and hardware w/ baked phenolic/epoxy coating; PFA-coated 316 SS shaft		Interpolated[2]
		D	Body, cone and hardware with PVDF coating; PFA-coated 316 SS shaft		UUT9
C	Number of valve bodies	F	Single valve with welded circular flange	2.5	UUT9
		1	One valve body (single, no flange)		UUT1, 3, 5, 6, 10
		2	Two valve bodies (dual)	2.5	UUT2, 4, 7-8
		3	Three valve bodies (triple)		Extrapolated[3]
		4	Four valve bodies (quad)		Extrapolated[3]
DD	Valve Size	08	8" valve	2.5	UUT1, 5, 9
		10	10" valve		UUT4, 7
		12	12" valve	2.5	Interpolated
		14	14" valve		UUT2, 3, 6, 8, 10
E	Flow/Pressure Operating Range	M	Medium Pressure	2.5	UUT1 -10
		L	Low Pressure		Extrapolated[4]
F	Valve Design	A	Conical-shape diffuser (Accel II)	2.5	UUT1-9
		S	Standard - Shut-Off Valve		UUT10
		L	Low Leakage - Shut-Off Valve		Extrapolated[5]
G	Control Type	C	Constant Volume	2.5	UUT1-4
		P	Pneumatic		Interpolated[6]
		B	Base Upgradeable - Pneumatic		Interpolated[6]
		F	Fixed, field adjustable to increase/decrease flow		Same as UUT1-4
		I	IP54 Electric Actuator with fail-to-last position; floating point		UUT5d
		A	Analog Pneumatic		UUT9
		E	Analog High Speed Electric		UUT7d
		L	Digital - Low-speed electric		UUT5c, 6c, 8b
		H	Digital - Medium-speed electric		Same as UUT5a-b, UUT6a-b, 7a, 8a, 10
		M	Digital - High-speed electric		UUT5a-b, UUT6a-b, 7a, 8a, 10
		N	Digital - Pneumatic		UUT7b-c
		Y	Base Upgradeable - Low Speed Electric (0-10 VDC)		Same as UUT5d
		Z	Base Upgradeable - Low Speed Electric (2-10 VDC)		Same as UUT5d
		Q	Base upgradeable- Med. Speed Electric (2-10 VDC)		Same as UUT5d
		R	Base upgradeable - Med. Speed Electric (4-20 mA)		Same as UUT5d
		S	Base upgradeable- Med. Speed Electric (0.5-10 VDC)		Same as UUT5d

Notes:

1. PSV/PEV pneumatically operated valves are the same as the pneumatic actuator valves tested for UUT7b, UUT7c and UUT9 except the controller and potentiometer are removed. BSV/BEV are the same as the tested Celeris MAV/EXV valves, except potentiometer and/or controller tested in the MAV/EXV are removed.

2. Within the confines of the tested options

3. Within the confines of the tested options. Three and Four valve bodies consist of a combination of the One and Two valve bodies mounted next to eachother in the

4. Extrapolated option is identical to tested option.

5. Low Leakage Shut-Off valve is the same construction as the Standard Shut-Off Valve.

6. Pneumatic and base-upgradeable pneumatic control types are represented by the valves tested for UUT7b and UUT7c except the controller and/or potentiometer

7. Fail Safe Position: EVI and IBO valve options were represented in constant volume valves UUT1 - UUT4.

8. Within the confines of the tested options.

Table 4 - Options - Horizontal Orientation (Continued)

Mounting Description: Horizontal in-line duct mounted (ceiling suspended)

Nomenclature: AAA B C DD E - F G H I J - xxx					
Nomenclature	**Property**	**Allowable Value**	**Allowable Value Description**	**Sds (g), z/h=1**	**Unit**
H	Valve Controller Designation	N	No electronics	2.5	UUT1-4
		E	Celeris/Analog Electronic Controller (Analog without boosters only)		UUT5, 6a-b, 7a-c, 8a, 10
		E	LonMarkElectronic Valve - Controlling Valve of Tracking Pair		UUT7d
		X	LonMark Electronic Valve - Controlling valve of tracking pair with expanded features		UUT8b
		O	LonMark Supply only Valve		UUT6c
		A	BACnet Electronic Valve - Controlling Valve of Tracking Pair		Same as UUT7d
		B	BACnet Electronic Valve - Controlling Valve of Tracking Pair with expanded features		Same as UUT8b
		Y	BACnet TX-RTN - Supply controlling primary exhaust and return		Same as UUT6c
		Z	BACnet TX-EXH - Supply controlling primary exhaust and locally controlled exhaust		Same as UUT6c
		C	BACnet Supply only Valve		Same as UUT6c
		D	BACnet Exhaust only Valve		Same as UUT6c
		H	Hood exhaust valve with pressure switch		UUT9
		F	Flow feedback in small black box		Smaller version of UUT9
		P	BACnet Electronic Valve for Phoenix Control brand		Same as UUT6c
		1	BACnet Electronic Valve for Alerton brand		Same as UUT6c
I	Valve Orientation	H	Horizontal	2.5	UUT1-10
		U	Vertical upflow	2.5	N/A
		D	Vertical downflow		N/A
J	Fail Safe Position	C	Normally closed valve	2.5	UUT7a, c, d; UUT8a
		O	Normally open valve		UUT5a-b, 6a-b, 7b, 9-10
		Z	Not applicable		UUT1-4, 5c-d, 6c, 8b
xxx	Valve Options	EVI	Exhaust valve with insulation and blocks	2.5	Interpolated[7]
		IBO	Insulation blocks only, no insulation		Interpolated[7]
		PSL	Pressure Switch, low limit		UUT9
		SFB	Square flange on both ends of single body valve		UUT1c, 3c, 5c-d; 6c
		SFX	Square flange on one end of single body valve; inlet on exhaust; discharge on supply		Interpolated[8]

Notes:

1. PSV/PEV pneumatically operated valves are the same as the pneumatic actuator valves tested for UUT7b, UUT7c and UUT9 except the controller and potentiometer
2. Within the confines of the tested options
3. Within the confines of the tested options. Three and Four valve bodies consist of a combination of the One and Two valve bodies mounted next to eachother in the
4. Extrapolated option is identical to tested option.
5. Low Leakage Shut-Off valve is the same construction as the Standard Shut-Off Valve.
6. Pneumatic and base-upgradeable pneumatic control types are represented by the valves tested for UUT7b and UUT7c except the controller and/or potentiometer
7. Fail Safe Position: EVI and IBO valve options were represented in constant volume valves UUT1 - UUT4.
8. Within the confines of the tested options.

Table 5- Certified Components, Constant Volume - Vertical Orientation

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Mounting Description: Vertical in-line duct mounted

Valve Family	Model Number	Valve Body	Diameter (in)	Dimensions (in)			Weight (lb)	Max. Vertical Duct Support Spacing	Orientation (Upflow / Downflow)	Sds (g), z/h=1	Connection Type [1]	Unit
				Depth	Width	Height						
CSV/CEV Constant Volume	CSVA108M-ACNDZ	Single	8	23.5	7.9	12.0	6	Within 12" from the edge of the valve	D	2.5	NF	UUT11
	CxVxx08x-ACNxZ-xxx	Single	8	23.5 to 30.0	7.9 to 14.0	12.0 to 19.5	6 to 16		U,D		NF, DB, SF, WF [2]	Interpolated
	CxVxx10x-ACNxZ-xxx	Single	10						U,D		NF, DB, SF, WF [2]	Interpolated
	CxVxx12x-ACNxZ-xxx	Single	12						U,D		NF, DB, SF, WF [2]	Interpolated
	CxVxx14x-ACNxZ-xxx	Single	14						U,D		NF, DB, SF, WF [2]	Interpolated
	CSVA114M-ACNDZ	Single	14	30.0	14.0	19.5	12		D		NF	UUT12
	CSVA210M-ACNDZ	Dual	10	24.0	20.0	14.0	18		D		SF	UUT13
	CxVx210x-ACNxZ-xxx	Dual	10	24.0 to 33.0	20.0 to 30.0	14.0 to 18.5	18 to 33		U,D		SF	Extrapolated [3]
	CxVx212x-ACNxZ-xxx	Dual	12						U,D		SF	Extrapolated [3]
	CxVx214x-ACNxZ-xxx	Dual	14						U,D		SF	Extrapolated [3]
	CSVA214M-ACNUZ	Dual	14	33.0	30.0	18.5	33		U		SF	Extrapolated [3]

Notes:

1. No Flange (NF) , No Flange with Drawband Clamps (DB) , Square Flange (SF), Welded Flange (WF)
2. DB tested in UUT 15a/b and 17, WF tested in UUT 16
3. Dual valve bodies tested in UUT 18, 19, 20

Table 6- Certified Components, Variable Volume - Vertical Orientation

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Mounting Description: Vertical in-line duct mounted

Valve Family	Model Number	Valve Body	Diameter (in)	Dimensions (in)			Weight (lb)	Max. Vertical Duct Support Spacing	Orientation (Upflow / Downflow)	Sds (g), z/h=1	Connection Type [2]	Unit
				Depth	Width	Height						
PSV/PEV Pneumatic[1]	PxVxx08x-xxxxx-xxx	Single	8	23.5 to 33.0	10.3 to 30.0	14.6 to 20.5	9 to 49	Within 12'' from the edge of the valve	U,D	2.5	NF, DB, SF, WF [3]	Extrapolated
	PxVxx10x-xxxxx-xxx	Single	10						U,D		NF, DB, SF, WF [3]	Extrapolated
	PxVxx12x-xxxxx-xxx	Single	12						U,D		NF, DB, SF, WF [3]	Extrapolated
	PxVxx14x-xxxxx-xxx	Single	14						U,D		NF, DB, SF, WF [3]	Extrapolated
	PxVx210x-xxxxx-xxx	Dual	10						U,D		SF	Extrapolated
	PxVx212x-xxxxx-xxx	Dual	12						U,D		SF	Extrapolated
	PxVx214x-xxxxx-xxx	Dual	14						U,D		SF	Extrapolated
BSV/BEV Base Upgradeable[1]	BxVxx08x-xxxxx-xxx	Single	8	23.5 to 33.0	10.3 to 30.0	14.6 to 20.5	9 to 49	Within 12'' from the edge of the valve	U,D	2.5	NF, DB, SF, WF [3]	Extrapolated
	BxVxx10x-xxxxx-xxx	Single	10						U,D		NF, DB, SF, WF [3]	Extrapolated
	BxVxx12x-xxxxx-xxx	Single	12						U,D		NF, DB, SF, WF [3]	Extrapolated
	BxVxx14x-xxxxx-xxx	Single	14						U,D		NF, DB, SF, WF [3]	Extrapolated
	BxVx210x-xxxxx-xxx	Dual	10						U,D		SF	Extrapolated
	BxVx212x-xxxxx-xxx	Dual	12						U,D		SF	Extrapolated
	BxVx214x-xxxxx-xxx	Dual	14						U,D		SF	Extrapolated
MAV/EXV Analog / Celeris	EXVD108M-AAEUC	Single	8	23.5	10.3	14.6	11	Within 12'' from the edge of the valve	U	2.5	DB	UUT15a
	EXVD108M-AMEUC	Single	8	23.5	10.3	14.6	11		U		DB	UUT15b
	MAV/EXVxx08x-xxxxx-xxx	Single	8	23.5 to 30.0	10.3 to 13.9	14.6 to 21.4	9 to 20		U,D		NF, DB, SF, WF [3]	Interpolated
	MAV/EXVxx10x-xxxxx-xxx	Single	10						U,D		NF, DB, SF, WF [3]	Interpolated
	MAV/EXVxx12x-xxxxx-xxx	Single	12						U,D		NF, DB, SF, WF [3]	Interpolated
	MAV/EXVxx14x-xxxxx-xxx	Single	14						U,D		NF, DB, SF, WF [3]	Interpolated
	MAVC114M-ALEUZ	Single	14	30.0	13.9	21.4	24		U		DB & SF [4]	UUT17
	MAV/EXVx210x-xxxxx-xxx	Dual	10	25.0	20.1	16.4	30		U,D		SF	Interpolated
	MAV/EXVx212x-xxxxx-xxx	Dual	12	30.0	24.5	18.4	32 to 36		U,D		SF	Interpolated
	EXVA212M-ANEDO	Dual	12	30.0	24.5	18.4	36		D		SF	UUT19
	MAV/EXVx214x-xxxxx-xxx	Dual	14	33.0	30.0	21.4	45 to 49		U,D		SF	Interpolated
	EXVA214M-AMEUO-PSL	Dual	14	33.0	30.0	21.4	49		U		SF	UUT20

Notes:

1. PSV/PEV and BSV/BEV are depopulated units from the MAV/EXV valve families
2. No Flange (NF) , No Flange with Drawband Clamps (DB) , Square Flange (SF), Welded Flange (WF)
3. Welded Flange (WF) tested in UUT 16
4. Valve constructed with a Drawband Clamp on one end and a Sqaure Flange on the other

Table 6- Certified Components, Variable Volume - Vertical Orientation (Continued)

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Mounting Description: Vertical in-line duct mounted

Valve Family	Model Number	Valve Body	Diameter (in)	Dimensions (inches)			Weight (lb)	Max. Vertical Duct Support Spacing	Orientation (Upflow / Downflow)	Sds (g), z/h=1	Connection Type [2]	Unit
				Depth	Width	Height						
HSV/HEV Theris[1]	HSVAF08M-LIXDZ-SFB	Single	8	23.5	10.3	14.6	11	Within 12" from the edge of the valve	D	2.5	WF	UUT16
	HxVxx08x-xxxxx-xxx	Single	8	23.5 to 30.0	10.3 to 13.9	14.6 to 21.4	9 to 24		U, D		NF, DB, SF, WF [3]	Interpolated
	HxVxx10x-xxxxx-xxx	Single	10						U, D		NF, DB, SF, WF [3]	Interpolated
	HxVxx12x-xxxxx-xxx	Single	12						U, D		NF, DB, SF, WF [3]	Interpolated
	HxVxx14x-xxxxx-xxx	Single	14						U, D		NF, DB, SF, WF [3]	Interpolated
	HxVx210x-xxxxx-xxx	Dual	10	25.0 to 33.0	20.0 to 30.0	16.5 to 20.5	30 to 49		U, D		SF	Interpolated
	HxVx212x-xxxxx-xxx	Dual	12						U, D		SF	Interpolated
	HxVx214x-xxxxx-xxx	Dual	14						U, D		SF	Interpolated
TSV/TEV Traccel[1]	TxVxx08x-xxxxx-xxx	Single	8	23.5 to 30.0	10.3 to 13.9	14.6 to 21.4	9 to 24	Within 12" from the edge of the valve	U, D	2.5	NF, DB, SF, WF [3]	Interpolated
	TxVxx10x-xxxxx-xxx	Single	10						U, D		NF, DB, SF, WF [3]	Interpolated
	TxVxx12x-xxxxx-xxx	Single	12						U, D		NF, DB, SF, WF [3]	Interpolated
	TxVxx14x-xxxxx-xxx	Single	14						U, D		NF, DB, SF, WF [3]	Interpolated
	TxVx210x-xxxxx-xxx	Dual	10	25.0 to 33.0	20.0 to 30.0	16.5 to 20.5	30 to 49		U, D		SF	Interpolated
	TxVx212x-xxxxx-xxx	Dual	12						U, D		SF	Interpolated
	TxVx214x-xxxxx-xxx	Dual	14						U, D		SF	Interpolated
	TSVA214M-ALXUZ	Dual	14	33.0	30.0	21.4	49		U		SF	UUT18

Notes:

1. HSV/HEV and TSV/TEV valves are similar to the MAV/EXV valve families, and ony differ by the type of controller.
2. No Flange (NF) , No Flange with Drawband Clamps (DB) , Square Flange (SF), Welded Flange (WF)
3. DB tested in UUT 15a/b and 17, NF tested in UUT 11 and 12

Table 7 - Certified Subcomponents - Vertical Orientation

Mounting Description: Vertical in-line duct mounted

Subcomponent [MFR]	Model Number	Description	Approx. Weight (lbs.)	Sds (g), z/h=1	Unit
Controller Board [PHOENIX CONTROLS] Material: PCB	C2V LOSEA	Low Speed	0.5	2.5	UUT17
	THERIS	Low Speed	0.5		UUT16
	TRACCEL	Low Speed	0.5		UUT18
	LVC HISEA	High Speed	0.7		UUT15b,20
	AVC HISEA	High Speed Analog	0.7		Interpolated
	C2V PNU	Pneumatic	0.7		UUT19
	VLV CNTRL ANALOG	Pneumatic Analog	0.7		UUT15a
Actuator [PHOENIX CONTROLS] Material: galvanized carbon steel	Intergral part of valve	Manual control actuator	0.5	2.5	UUT11-13
Actuator [PHOENIX CONTROLS] Material: plastic and carbon steel	490-000-073	High Speed Electric Linear Actuator	2.6	2.5	UUT15b
	490-000-092	High Speed Electric Linear Actuator	2.6		Same as UUT15b
	490-000-095	Medium Speed Electric Linear Actuator	2.6		Same as UUT15b
Actuator [THOMSON] Material: plastic and carbon steel	DH12-17W41	High Speed Electric Linear Actuator	1.9	2.5	Same as UUT20
	DH12-17W42	High Speed Electric Linear Actuator	1.9		UUT20
Actuator [BELIMO] Material: plastic and carbon steel	NMB24-SR	Proportional Control, Non-Spring Return, Direct Coupled, 24V	2.5	2.5	UUT18
	NMB24-3.1 PH	On/off Floating Point Control, Non-Spring Return, 24 V	2.5		Interpolated[1]
	NMQBX24-MFT	Programable, Non-Spring Return, 24 V	2.7		Interpolated[1]
	AMB24-SR	Proportional Control, Non-Spring Return, 24V	2.7		UUT17
	AMB24-3.1 PH	On/off Floating Point Control, Non-Spring Return, 24 V	2.7		Extrapolated[2]
	AMQBX24-MFT	Programable, Non-Spring Return, 24 V	4.5		Extrapolated[2]
	GMB24-ST	Proportional Control, Non-Spring Return, 24V	4.6		Extrapolated[2]
	GMB24-3 PH	On/Off Floating Point Control, Non-Spring Return, Direct Coupled, 24V	4.6		Extrapolated[2]
Actuator [HONEYWELL] Material: plastic and carbon steel	ML6174B2019	On/off Floating Point Control, Non-Spring Return Damper Actuator, 24 V	2.8	2.5	UUT16
	ML7174A2001	Proportional Control, Non-Spring Return Damper Actuator, 24 V	2.9		Same as 16
Actuator [KMC] Material: plastic and carbon steel	MCP-0335	3" Pneumatic control actuator (open/closed position)	2.7	2.5	UUT15a
	MCP-0435	4" Pneumatic control actuator (open/closed position)	3.6		UUT19
Pressure switch [HONEYWELL] Material: plastic and carbon steel	1227D1/A, 0.30" WC PF	Pressure Switch	0.2	2.5	UUT20

1. Same as tested in UUT18, except slightly smaller and with software change.

2. Same as tested in UUT17, except slightly smaller and with software change.

Table 8 - Options - Vertical Orientation

Mounting Description: Vertical in-line duct mounted

Nomenclature: AAA B C DD E - F G H I J - xxx					
Nomenclature	**Property**	**Allowable Value**	**Allowable Value Description**	**Sds (g), z/h=1**	**Unit**
AAA	Valve Family	CSV/CEV	Constant Volume	2.5	UUT11-13
		PSV/PEV	Pneumatic		Interpolated[1]
		BSV/BEV	Base Upgradeable		Interpolated[1]
		MAV/EXV	Analog		UUT15a,b
		MAV/EXV	Celeris		UUT17, 19, 20
		HSV/HEV	Theris		UUT16
		TSV/TEV	Traccel		UUT18
B	Valve Construction	A	Body and cone - uncoated aluminum; shaft - uncoated 316 SS	2.5	UUT11-13, 16, 18-20
		B	Body and cone with baked phenolic coating; PFA-coated 316 SS shaft		Interpolated
		C	Body, cone and hardware w/ baked phenolic/epoxy coating; PFA-coated 316 SS shaft		UUT17
		D	Body, cone and hardware with PVDF coating; PFA-coated 316 SS shaft		UUT15
C	Number of valve bodies	F	Single valve with welded circular flange	2.5	UUT16
		1	One valve body (single, no flange)		UUT11-12, 15a,b, 17
		2	Two valve bodies (dual)	2.5	UUT13, 18-20
		3	Three valve bodies (triple)		Extrapolated[2]
		4	Four valve bodies (quad)		Extrapolated[2]
DD	Valve Size	08	8" valve	2.5	UUT11, 15a-b, 16
		10	10" valve		Interpolated
		12	12" valve		UUT19
		14	14" valve		UUT12, 17, 18, 20
E	Flow/Pressure Operating Range	M	Medium Pressure	2.5	UUT11-13, 15-20
		L	Low Pressure		Same as UUT11-13, 15-20
F	Valve Design	A	Conical-shape diffuser (Accel II)	2.5	UUT11-13, 15, 17-20
		S	Standard - Shut-Off Valve		Same as UUT16
		L	Low Leakage - Shut-Off Valve		UUT16
G	Control Type	C	Constant Volume	2.5	UUT11-13
		P	Pneumatic		Interpolated[3]
		B	Base Upgradeable - Pneumatic		Interpolated[3]
		F	Fixed, field adjustable to increase/decrease flow		Same as UUT11-13
		I	IP54 Electric Actuator with fail-to-last position; floating point		UUT 16
		A	Analog Pneumatic		UUT15a
		E	Analog High Speed Electric		Interpolated[4]
		L	Digital - Low-speed electric		UUT17, 18
		H	Digital - Medium-speed electric		Same as UUT15b, 20
		M	Digital - High-speed electric		UUT15b, 20
		N	Digital - Pneumatic		UUT19
		Y	Base Upgradeable - Low Speed Electric (0-10 VDC)		Same as UUT17, 18
		Z	Base Upgradeable - IP54 Low Speed Electric (2-10 VDC)		Same as UUT17, 18
		Q	Base upgradeable - Med. Speed Electric (2-10 VDC)		Same as UUT17, 18
		R	Base upgradeable - Med. Speed Electric (4-20 mA)		Same as UUT17, 18
		S	Base upgradeable - Med. Speed Electric (0.5-10 VDC)		Same as UUT17, 18

1. PSV/PEV pneumatically operated valves are the same as the pneumatic actuator valves tested except the controller and potentiometer are removed. BSV/BEV are the same as the tested Celeris MAV/EXV valves, except potentiometer and/or controller tested in the MAV/EXV are removed.

2. Within the confines of the tested options. Three and Four valve bodies consist of a combination of the One and Two valve that are structurally independent.

3. Pneumatic and base-upgradeable pneumatic control types are represented by the valves tested for UUT15a and UUT19 except the controller and/or potentiometer are removed.

4. Interpolated option: using the same PCB as UUT15a and actuator as UUT15b

Table 8 - Options - Vertical Orientation (Continued)

Mounting Description: Vertical in-line duct mounted

Nomenclature: AAA B C DD E - F G H I J - xxx					
Nomenclature	**Property**	**Allowable Value**	**Allowable Value Description**	**Sds (g), z/h=1**	**Unit**
H	Valve Controller Designation	N	No electronics	2.5	UUT11-13
		E	Celeris/Analog Electronic Controller (Analog without boosters only)		UUT15a,b
		E	LonMarkElectronic Valve - Controlling Valve of Tracking Pair		UUT19, 20
		X	LonMark Electronic Valve - Controlling valve of tracking pair with expanded features		UUT18
		O	LonMark Supply only Valve		Same as UUT18
		A	BACnet Electronic Valve - Controlling Valve of Tracking Pair		UUT16
		B	BACnet Electronic Valve - Controlling Valve of Tracking Pair with expanded features		Same as UUT16
		Y	BACnet TX-RTN - Supply controlling primary exhaust and return		Same as UUT16
		Z	BACnet TX-EXH - Supply controlling primary exhaust and locally controlled exhaust		Same as UUT16
		C	BACnet Supply only Valve		Same as UUT16
		D	BACnet Exhaust only Valve		Same as UUT16
		H	Hood exhaust valve with pressure switch		Same as UUT20
		F	Flow feedback in small black box		Smaller version of UUT15a
		P	BACnet Electronic Valve for Phoenix Control brand		Same as UUT16
		1	BACnet Electronic Valve for Alerton brand		Same as UUT16
I	Valve Orientation	H	Horizontal	2.5	N/A
		U	Vertical upflow	2.5	15a-b, 17-20
		D	Vertical downflow		UUT10-13, 16
J	Fail Safe Position	C	Normally closed valve	2.5	UUT15a,b
		O	Normally open valve		UUT19,20
		Z	Not applicable		UUT16,17,18
xxx[1]	Valve Options	EVI	Exhaust valve with insulation and blocks	2.5	UUT 17
		IBO	Insulation blocks only, no insulation		Depopulated UUT17
		PSL	Pressure Switch, low limit		UUT20
		SFB	Square flange on both ends of single body valve		UUT 16
		SFX	Square flange on one end of single body valve; inlet on exhaust; discharge on supply		Extrapolated[2]

1. Not all valves have options. Optionless valves have this portion of the model number left blank

2. Within the confines of the tested options.

Nomenclature Chart: Phoenix Controls Accel II Airflow Control Valves

M A V A 1 1 4 M - A M E H C - _

VALVE FAMILY

CSV	=	Constant volume Supply Valve
CEV	=	Constant volume Exhaust Valve
PSV	=	Pneumatic supply valve (no feedback)
PEV	=	Pneumatic exhaust valve (no feedback)
BSV	=	Base upgradeable supply valve
BEV	=	Base upgradeable exhaust valve
MAV	=	Analog/Celeris supply valve
EXV	=	Analog/Celeris exhaust valve
HSV	=	Theris Supply Valve Healthcare
HEV	=	Theris Exhaust Valve Healthcare
TSV	=	Traccel Supply Valve Life Science
TEV	=	Traccel Exhaust Valve Life Science

VALVE CONSTRUCTION

A	=	Body and cone - uncoated aluminum; Shaft - uncoated 316 stainless steel
B	=	Body and cone with baked phenolic coating; PFA-coated 316 stainless steel shaft
C	=	Body, cone and hardware with baked phenolic/epoxy phenolic coating; PFA-coated 316 stainless steel shaft
D	=	Body, cone and hardware with PVDF coating; PFA-coated 316 stainless steel shaft

NUMBER OF VALVE BODIES

F	=	Single valve with welded Circular Flanges
1	=	One valve body (single, no flange)
2	=	Two valve bodies (dual)
3	=	Three valve bodies (triple) (Analog and Uncontrolled Valves only)
4	=	Four valve bodies (quad) (Analog and Uncontrolled Valves only)

VALVE SIZE

08	=	8" valve (7.88" actual diameter)
10	=	10" valve (9.88" actual diameter)
12	=	12" valve (11.88" actual diameter)
14	=	14" valve (13.88" actual diameter)

FLOW/PRESSURE OPERATING RANGE

M	=	Medium pressure (0.6" to 3.0")
L	=	Low Pressure (0.3" to 3.0")

VALVE DESIGN

A	=	**Conical-shape diffuser (Accel II)**
S	=	**Standard, Shut-Off Valve**
L	=	**Low Leakage, Shut-Off Valve**

CONTROL TYPE (Platform and Actuator)

C	=	**Constant Volume (field adjustable with 7/16" hex head nut driver)**
P	=	**Pneumatic**
B	=	**Base upgradeable - Pneumatic**
F	=	**Fixed, field adjustable with knob and increase/decrease flow label**
I	=	**All: IP54 electric actuator with fail-to-last position; 8xV: Floating point**
Y	=	**Base upgradeable - Low Speed Electric (0-10VDC)**
Z	=	**Base upgradeable - IP 54 Low Speed Electric (2-10VDC)**
A	=	**Analog-Pneumatic**
E	=	**Analog - High-speed electric**
L	=	**Digital - Low-speed electric**
H	=	**Digital - Medium Speed Electric**
M	=	**Digital - High-speed electric**
N	=	**Digital - Pneumatic**
Q	=	**Base upgradeable - Medium Speed Electric (2-10VDC)**
S	=	**Base upgradeable - Medium Speed Electric (4-20 mA)**
R	=	**Base upgradeable - Medium Speed Electric (0.5-10VDC)**

FAIL SAFE POSITION

C	=	**Normally closed valve**
O	=	**Normally open valve**
Z	=	**Not applicable**

VALVE ORIENTATION

H	=	**Horizontal**
U	=	**Vertical upflow**
D	=	**Vertical downflow**

VALVE CONTROLLER DESIGNATION

N	=	No electronics (Traccel/Theris Tracking Valve or CV)
E	=	Celeris/Analog Electronic Controller (Analog without boosters only)
F	=	LonMark Electronic valve - Controlling Valve of Tracking Pair
X	=	LonMark Electronic valve - Controlling Valve of Tracking Pair with Expanded Features
O	=	LonMark Supply only Valve - No Tracking Pair Ability
A	=	BACnet Electronic Valve - Controlling Valve of Tracking Pair
B	=	BACnet Electronic Valve - Controlling Valve of Tracking Pair with Expanded Features
Y	=	BACnet TX-RTN (Supply controlling primary exhaust and Return Valve)
Z	=	BACnet TX-EXH (Supply controlling primary exhaust and locally controlled exhaust)
C	=	BACnet Supply Only Valve - No Tracking Pair Ability
D	=	BACnet Exhaust Only Valve - No Tracking Pair Ability
H	=	Hood exhaust valve with pressure switch
F	=	Flow Feedback in Small Black box
1	=	BACnet Electronic Valve-Programmable Alerton brand (Same as A/B/C/D/Y/Z, programmable)
P		BACnet Electronic Valve-Programmable Phoenix brand Same as A/B/C/D/Y/Z, programmable)

VALVE OPTIONS - (As required; list alphabetically separated by dashes, when multiples are ordered)

EVI	=	Exhaust Valve with insulation and blocks
IBO	=	Insulation blocks only, no insulation
PSL	=	Pressure switch, low limit
SFB	=	Square flange on both ends of single body valve
SFX	=	Square flange on one end of single body valve: inlet on exhaust; discharge on supply

Table 9 - Tested Units - Horizontal Orientation

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Tested Product Construction: Valve construction is Type A, B, C or D. Body and cone are aluminum with 316 stainless steel shaft (coated or uncoated).

Tested Options: Various valve construction, valve body number and size (8" to 14"), horizontal orientation, controllers, actuators and pressure switch.

Mounting Description: Horizontal in-line duct mounted (ceiling suspended)

Model Number	Valve Family	Valve Body	Diameter (in)	Dimensions (in)			Weight (lb)	Max. Hanger Rod Spacing (in)	Connection Type [1]	Sds (g), z/h=1	Unit
				Depth	Width	Height					
CSVA108M-ACNHZ	CSV/CEV Constant Volume	Single	8	23.5	7.9	12.0	6	48	NF	2.5	UUT1a
CSVA108M-ACNHZ	CSV/CEV Constant Volume	Single	8	23.5	7.9	12.0	8		DB	2.5	UUT1b
CSVA108M-ACNHZ-SFB	CSV/CEV Constant Volume	Single	8	23.5	7.9	12.0	8		SF	2.5	UUT1c
CSVA214M-ACNHZ	CSV/CEV Constant Volume	Dual	14	33.0	30.0	18.5	33		SF	2.5	UUT2
CSVA114M-ACNHZ	CSV/CEV Constant Volume	Single	14	30.0	14.0	19.5	12		NF	2.5	UUT3a
CSVA114M-ACNHZ	CSV/CEV Constant Volume	Single	14	30.0	14.0	19.5	15		DB	2.5	UUT3b
CSVA114M-ACNHZ-SFB	CSV/CEV Constant Volume	Single	14	30.0	14.0	19.5	16		SF	2.5	UUT3c
CSVA210M-ACNHZ	CSV/CEV Constant Volume	Dual	10	24.0	20.0	14.0	18		SF	2.5	UUT4
EXVA108M-AMEHO (Celeris)	MAV/EXV Analog / Celeris	Single	8	23.5	10.3	14.6	9		NF	2.5	UUT5a
EXVA108M-AMEHO (Celeris)	MAV/EXV Analog / Celeris	Single	8	23.5	10.3	14.6	11		DB	2.5	UUT5b
EXVA108M-ALEHZ-SFB (Celeris)	MAV/EXV Analog / Celeris	Single	8	23.5	10.3	14.6	11		SF	2.5	UUT5c
EXVA108M-AIEHZ-SFB (Celeris)	MAV/EXV Analog / Celeris	Single	8	23.5	10.3	14.6	11		SF	2.5	UUT5d
EXVA114M-AMEHO (Celeris)	MAV/EXV Analog / Celeris	Single	14	30.0	13.9	21.4	20		NF	2.5	UUT6a
EXVA114M-AMEHO (Celeris)	MAV/EXV Analog / Celeris	Single	14	30.0	13.9	21.4	23		DB	2.5	UUT6b
HSVA114M-ALOHZ-SFB	HSV/HEV Theris	Single	14	30.0	13.9	21.4	24		SF	2.5	UUT6c
EXVA210M-AMEHC (Celeris)	MAV/EXV Analog / Celeris	Dual	10	25.0	20.0	16.5	30		SF	2.5	UUT7a
EXVA210M-ANEHO (Celeris)	MAV/EXV Analog / Celeris	Dual	10	25.0	20.0	16.5	30		SF	2.5	UUT7b
EXVA210M-ANEHC (Celeris)	MAV/EXV Analog / Celeris	Dual	10	25.0	20.0	16.5	30		SF	2.5	UUT7c
EXVA210M-AEEHC (Analog)	MAV/EXV Analog / Celeris	Dual	10	25.0	20.0	16.5	30		SF	2.5	UUT7d
EXVA214M-AMEHC (Celeris)	MAV/EXV Analog / Celeris	Dual	14	33.0	30.0	20.5	49		SF	2.5	UUT8a
TSVA214M-ALXHZ	TSV/TEV Traccel	Dual	14	33.0	30.0	20.5	49		SF	2.5	UUT8b
EXVDF08M-AAEHO-PSL / EXVDF08M-AAHHO (Analog)	MAV/EXV Analog / Celeris	Single	8	23.5	10.3	14.6	17		WF	2.5	UUT9
EXVB114M-SMEHO (Celeris)	MAV/EXV Analog / Celeris	Single	14	30.0	13.9	21.4	24		SF	2.5	UUT10

Notes:

1. No Flange (NF) , No Flange with Drawband Clamps (DB) , Square Flange (SF) , Welded Flange (WF)

Table 10 - Tested Units - Vertical Orientation

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Tested Product Construction: Valve construction is Type A, B, C or D. Body and cone are aluminum with 316 stainless steel shaft (coated or uncoated).

Tested Options: Various valve construction, valve body number and size (8" to 14"), vertical upflow/downflow orientation, controllers, actuators and pressure switch.

Mounting Description: Vertical in-line duct mounted

Model Number	Valve Family	Valve Body	Diameter (in)	Dimensions (in)			Weight (lb)	Max. Vertical Duct Support Spacing	Connection Type [1]	Sds (g), z/h=1	Unit
				Depth	Width	Height					
CSVA108M-ACNDZ	CSV/CEV Constant Volume	Single	8	23.5	7.9	12.0	6	Within 12" from the edge of the valve	NF	2.5	UUT11
CSVA114M-ACNDZ	CSV/CEV Constant Volume	Single	14	30.0	14.0	19.5	12		NF	2.5	UUT12
CSVA210M-ACNDZ	CSV/CEV Constant Volume	Dual	10	24.0	20.0	14.0	18		NF	2.5	UUT13
EXVD108M-AAEUC	MAV/EXV Analog / Celeris	Single	8	23.5	10.3	14.6	11		NF	2.5	UUT15a
EXVD108M-AMEUC	MAV/EXV Analog / Celeris	Single	8	23.5	10.3	14.6	11		DB	2.5	UUT15b
HSVAF08M-LIXDZ-SFB	HSV/HEV Theris	Single	8	23.5	10.3	14.6	11		WF	2.5	UUT16
MAVC114M-ALEUZ	MAV/EXV Analog / Celeris	Single	14	30.0	13.9	21.4	24		DB & SF	2.5	UUT17
TSVA214M-ALXUZ	TSV/TEV Traccel	Dual	14	33.0	30.0	21.4	49		SF	2.5	UUT18
EXVA212M-ANEDO	MAV/EXV Analog / Celeris	Dual	12	30.0	24.5	18.4	36		SF	2.5	UUT19
EXVA214M-AMEUO-PSL	MAV/EXV Analog / Celeris	Dual	14	33.0	30.0	21.4	49		SF	2.5	UUT20

Notes:

1. No Flange (NF) , No Flange with Drawband Clamps (DB) , Square Flange (SF) , Welded Flange (WF)

UUT1a

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: CSVA108M-ACNHZ

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Constant Volume valve family, valve construction A, single valve body, 8" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

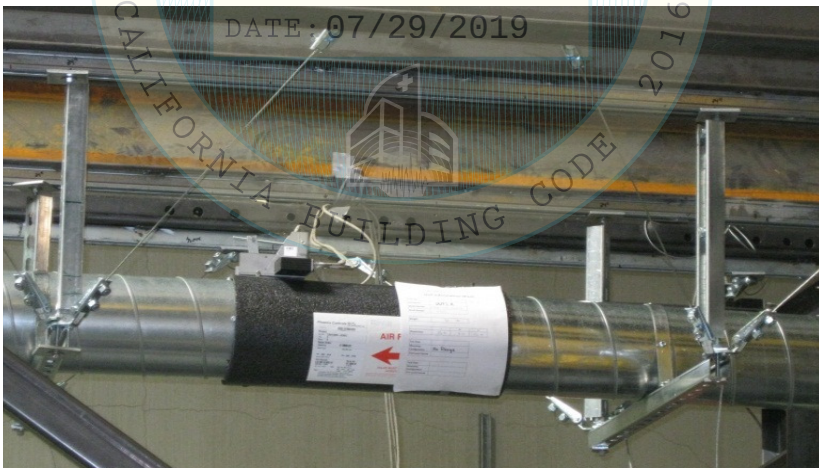
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
6	23.5	7.9	12	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:



UUT 1a was ceiling-suspended. Duct was attached to the unit with (4) #14 self tapping screws spaced at 90 degrees. The duct was attached to the top of the strut with steel 3/4'' wide, 24ga strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 self tapping screws per side, spaced at 90 degrees. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48'' apart and 24'' down from the fixture. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT1b

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: CSVA108M-ACNHZ

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Constant Volume valve family, valve construction A, one valve body, 8" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

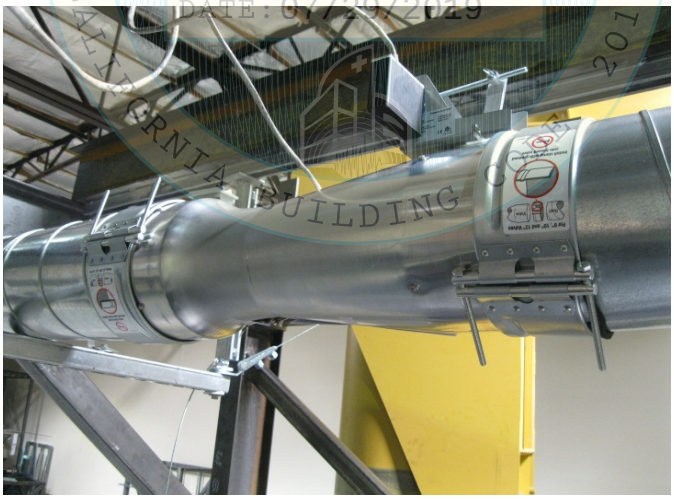
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
8	23.5	7.9	12	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:



UUT 1b was ceiling-suspended. Duct was attached to the unit with (2) DBK-1-08 drawband clamps. The duct was attached to the top of the strut with steel 3/4'' wide, 24ga strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 self tapping screws per side, spaced at 90 degrees. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48'' apart and 24'' down from the fixture. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT1c

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: CSVA108M-ACNHZ-SFB

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Constant Volume valve family, valve construction A, one valve body, 8" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

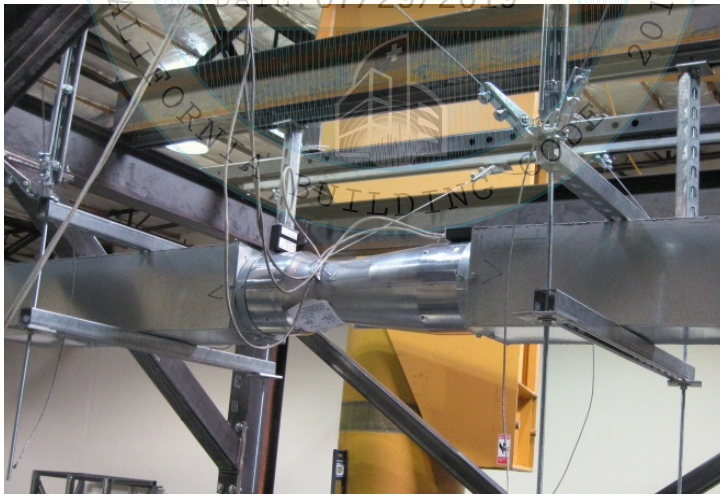
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
8	23.5	7.9	12	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:



UUT 1c was ceiling-suspended with square flange mount; the flange was attached to the unit with (4) #14 self tapping screws spaced at 90 degrees. The duct was attached to the flange with (4) #14 self tapping screws, one on each side. The duct was fastened top and bottom 1 5/8'' 12 ga strut; the strut was attached to the duct, 24'' from the center of the valve with (6) #14 self tapping screws per strut spaced approximately 2'' on center. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48'' and hung approximately 24'' down. Rod stiffeners and rod stiffening clips were used. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT2

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: CSVA214M-ACNHZ

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Constant Volume valve family, valve construction A, two valve bodies, 14" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

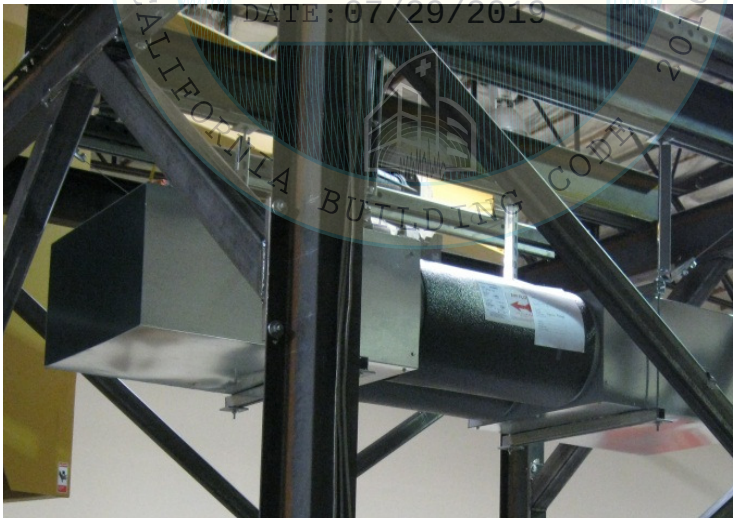
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
33	33	30	18.5	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:



UUT 2 was ceiling-suspended; the rectangular duct was attached to the unit with (10) #14 self tapping screws, (3) on each long side, (2) on each short side, approximately 1'' in from the corners and in the center. The duct was fastened top and bottom 1 5/8'' 12 ga strut; the strut was attached to the duct, 24'' from the center of the valve with (6) #14 self tapping screws per strut spaced approximately 2'' on center. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48'' and hung approximately 24'' down. Rod stiffeners and rod stiffening clips were used. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT3a

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: CSVA114M-ACNHZ

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Constant Volume valve family, valve construction A, one valve body, 14" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
12	30	14	19.5	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 3a ceiling-suspended. Duct was attached to the unit with (4) #14 self tapping screws spaced at 90 degrees. The duct was attached to the top of the strut with steel 3/4'' wide, 24ga strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 self tapping screws per side, spaced at 90 degrees. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48'' apart and 24'' down from the fixture. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT3b

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: CSVA114M-ACNHZ

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Constant Volume valve family, valve construction A, one valve body, 14" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

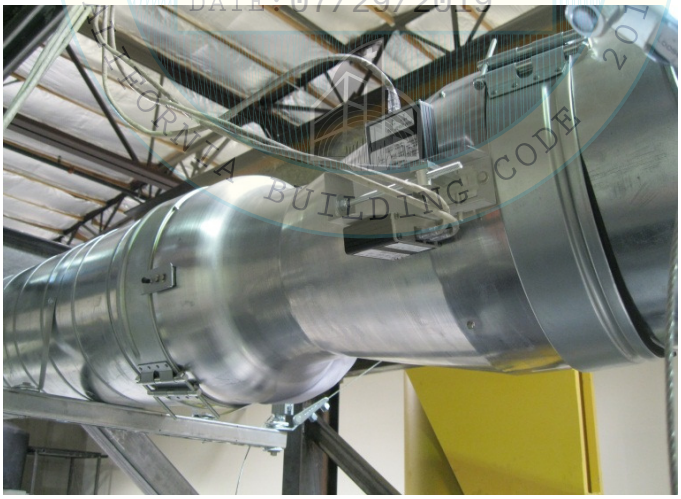
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
15	30	14	19.5	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:



UUT 3b ceiling-suspended. Duct was attached to the unit with (2)DBK-1-14 drawband clamps. The duct was attached to the top of the strut with steel 3/4'' wide, 24ga strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 self tapping screws per side, spaced at 90 degrees. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48'' apart and 24'' down from the fixture. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT3c

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: CSVA114M-ACNHZ-SFB

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Constant Volume valve family, valve construction A, one valve body, 14" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

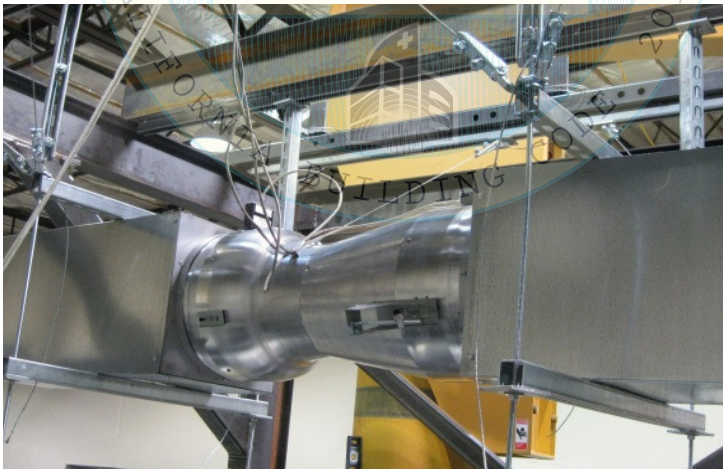
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
16	30	14	19.5	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:



UUT 3c was ceiling-suspended with square flange mount; the flange was attached to the unit with (4) #14 self tapping screws spaced at 90 degrees. The duct was attached to the flange with (8) #14 self tapping screws, spaced 1'' in from the corners. The duct was fastened top and bottom 1 5/8'' 12 ga strut; the strut was attached to the duct, 24'' from the center of the valve with (6) #14 self tapping screws per strut spaced approximately 2'' on center. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48'' and hung approximately 24'' down. Rod stiffeners and rod stiffening clips were used. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT4

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: CSVA210M-ACNHZ

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Constant Volume valve family, valve construction A, two valve bodies, 10" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
18	24	20	14	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 4 was ceiling-suspended; the rectangular duct was attached to the unit with (10) #14 self tapping screws, (3) on each long side, (2) on each short side, approximately 1'' in from the corners and in the center. The duct was fastened top and bottom 1 5/8'' 12 ga strut; the strut was attached to the duct, 24'' from the center of the valve with (6) #14 self tapping screws per strut spaced approximately 2'' on center. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48'' and hung approximately 24'' down. Rod stiffeners and rod stiffening clips were used. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT5a

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVA108M-AMEHO

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Celeris valve family, valve construction A, one valve body, 8" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
9	23.5	10.3	14.6	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 5a was ceiling-suspended. Duct was attached to the unit with (4) #14 self tapping screws spaced at 90 degrees. The duct was attached to the top of the strut with steel 3/4'' wide, 24ga strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 self tapping screws per side, spaced at 90 degrees. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48'' apart and 24'' down from the fixture. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT5b

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVA108M-AMEHO

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Celeris valve family, valve construction A, one valve body, 8" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
11	23.5	10.3	14.6	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 5b was ceiling-suspended. Duct was attached to the unit with (2) DBK-1-08 drawband clamps. The duct was attached to the top of the strut with steel 3/4'' wide, 24ga strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 self tapping screws per side, spaced at 90 degrees. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48'' apart and 24'' down from the fixture. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT5c

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVA108M-ALEHZ-SFB

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Celeris valve family, valve construction A, one valve body, 8" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

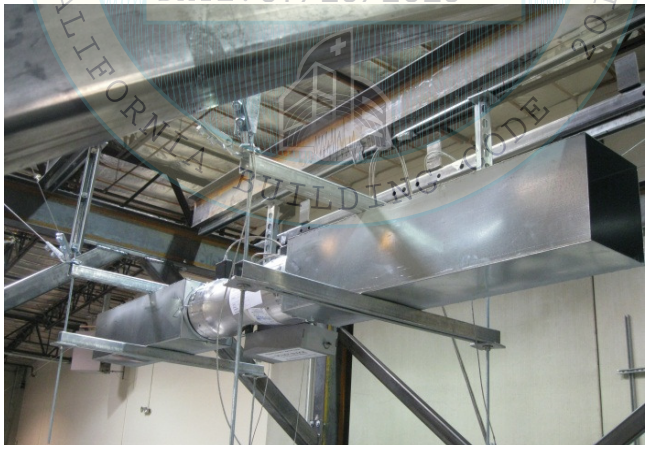
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
11	23.5	10.3	14.6	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:



UUT 5c was ceiling-suspended with square flange mount; the flange was attached to the unit with (4) #14 self tapping screws spaced at 90 degrees. The duct was attached to the flange with (4) #14 self tapping screws, one on each side. The duct was fastened top and bottom 1 5/8'' 12 ga strut; the strut was attached to the duct, 24'' from the center of the valve with (6) #14 self tapping screws per strut spaced approximately 2'' on center. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48'' and hung approximately 24'' down. Rod stiffeners and rod stiffening clips were used. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT5d

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVA108M-AIEHZ-SFB

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Celeris valve family, valve construction A, one valve body, 8" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
11	23.5	10.3	14.6	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 5d was ceiling-suspended with square flange mount; the flange was attached to the unit with (4) #14 self tapping screws spaced at 90 degrees. The duct was attached to the flange with (4) #14 self tapping screws, one on each side. The duct was fastened top and bottom 1 5/8'' 12 ga strut; the strut was attached to the duct, 24'' from the center of the valve with (6) #14 self tapping screws per strut spaced approximately 2'' on center. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48'' and hung approximately 24'' down. Rod stiffeners and rod stiffening clips were used. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT6a

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVA114M-AMEHO

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Celeris valve family, valve construction A, one valve body, 14" valve, medium pressure operating range, conical shaped diffuser, digital high speed electric controller type, Celeris electronic controller designation, horizontal orientation, normally open valve fail safe position. Phoenix Controls actuator, horizontal orientation.

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
20	30	13.9	21.4	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 6a was ceiling-suspended. Duct was attached to the unit with (4) #14 self tapping screws spaced at 90 degrees. The duct was attached to the top of the strut with steel 3/4'' wide, 24ga strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 self tapping screws per side, spaced at 90 degrees. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48'' apart and 24'' down from the fixture. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximatelty 45 degrees horizontally and vertically.

UUT6b

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVA114M-AMEHO

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Celeris valve family, valve construction A, one valve body, 14" valve, medium pressure operating range, conical shaped diffuser, digital high speed electric controller type, Celeris electronic controller designation, horizontal orientation, normally open valve fail safe position. Thomson DH12-17W42 actuator.

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

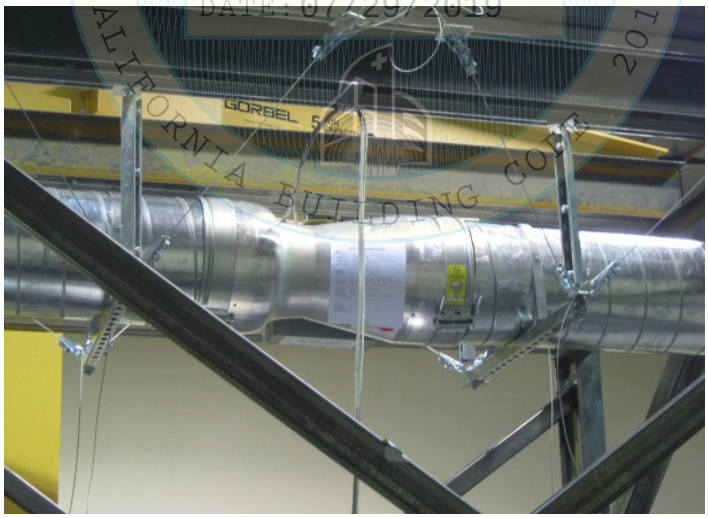
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
23	30	13.9	21.4	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:



UUT 6b was ceiling-suspended. Duct was attached to the unit with (2) DBK-1-14 drawband clamps. The duct was attached to the top of the strut with steel 3/4'' wide, 24ga strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 self tapping screws per side, spaced at 90 degrees. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48'' apart and 24'' down from the fixture. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT6c

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: HSVA114M-ALOHZ-SFB

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Theris valve family, valve construction A, one valve body, 14" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
24	30	13.9	21.4	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 6c was ceiling-suspended with square flange mount; the flange was attached to the unit with (4) #14 self tapping screws spaced at 90 degrees. The duct was attached to the flange with (8) #14 self tapping screws, spaced 1'' in from the corners. The duct was fastened top and bottom 1 5/8'' 12 ga strut; the strut was attached to the duct, 24'' from the center of the valve with (6) #14 self tapping screws per strut spaced approximately 2'' on center. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48'' and hung approximately 24'' down. Rod stiffeners and rod stiffening clips were used. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT7a

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVA210M-AMEHC

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Celeris valve family, valve construction A, two valve bodies, 10" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
30	25	20	16.5	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 7a was ceiling-suspended; the rectangular duct was attached to the unit with (12) #14 self tapping screws approximately 1'' in from the corners and in the center. The duct was fastened top and bottom 1 5/8'' 12 ga strut; the strut was attached to the duct, 24'' from the center of the valve with (6) #14 self tapping screws per strut spaced approximately 2'' on center. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48'' and hung approximately 24'' down. Rod stiffeners and rod stiffening clips were used. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT7b

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVA210M-ANEHO

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Celeris valve family, valve construction A, two valve bodies, 10" valve, medium pressure operating range, conical shaped diffuser, digital pneumatic controller type, Celeris electronic controller designation, horizontal orientation, normally open valve fail safe position. 4" pneumatic actuator.

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

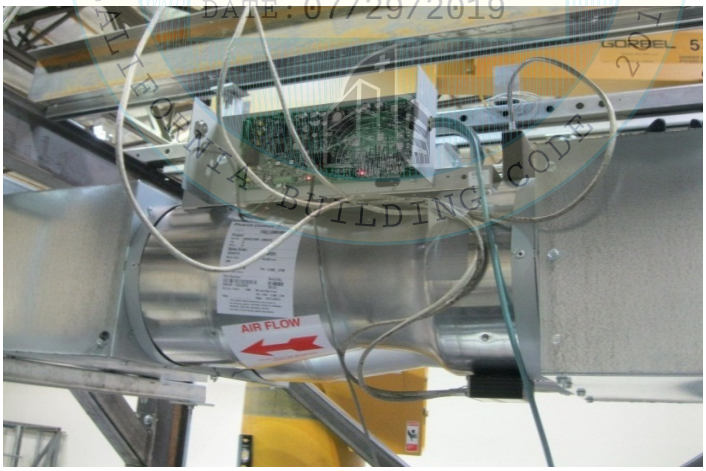
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
30	25	20	16.5	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:



UUT 7b was ceiling-suspended; the rectangular duct was attached to the unit with (12) #14 self tapping screws approximately 1'' in from the corners and in the center. The duct was fastened top and bottom 1 5/8'' 12 ga strut; the strut was attached to the duct, 24'' from the center of the valve with (6) #14 self tapping screws per strut spaced approximately 2'' on center. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48'' and hung approximately 24'' down. Rod stiffeners and rod stiffening clips were used. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT7c

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVA210M-ANEHC

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Celeris valve family, valve construction A, two valve bodies, 10" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
30	25	20	16.5	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 7c was ceiling-suspended; the rectangular duct was attached to the unit with (12) #14 self tapping screws approximately 1'' in from the corners and in the center. The duct was fastened top and bottom 1 5/8'' 12 ga strut; the strut was attached to the duct, 24'' from the center of the valve with (6) #14 self tapping screws per strut spaced approximately 2'' on center. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48'' and hung approximately 24'' down. Rod stiffeners and rod stiffening clips were used. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT7d

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVA210M-AEEHC

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Celeris valve family, valve construction A, two valve bodies, 10" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
30	25	20	16.5	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 7d was ceiling-suspended; the rectangular duct was attached to the unit with (12) #14 self tapping screws approximately 1'' in from the corners and in the center. The duct was fastened top and bottom 1 5/8'' 12 ga strut; the strut was attached to the duct, 24'' from the center of the valve with (6) #14 self tapping screws per strut spaced approximately 2'' on center. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48'' and hung approximately 24'' down. Rod stiffeners and rod stiffening clips were used. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT8a

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVA214M-AMEHC

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Celeris valve family, valve construction A, two valve bodies, 14" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

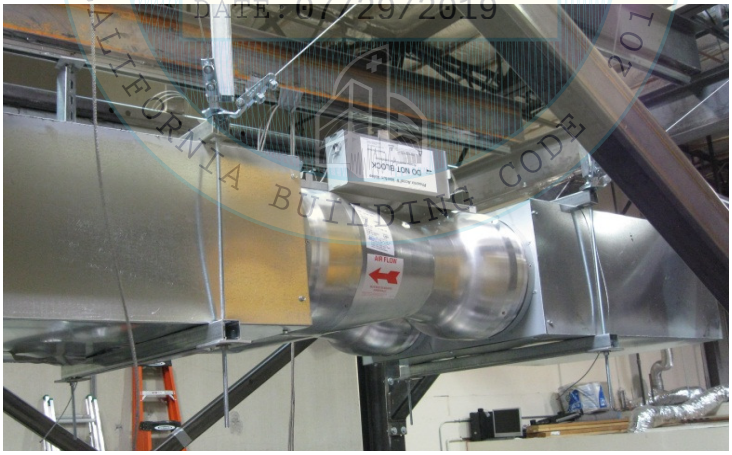
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
49	33	30	20.5	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:



UUT 8a was ceiling-suspended; the rectangular duct was attached to the unit with (10) #14 self tapping screws, (3) on each long side, (2) on each short side, approximately 1'' in from the corners and in the center. The duct was fastened top and bottom 1 5/8'' 12 ga strut; the strut was attached to the duct, 24'' from the center of the valve with (6) #14 self tapping screws per strut spaced approximately 2'' on center. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48'' and hung approximately 24'' down. Rod stiffeners and rod stiffening clips were used. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT8b

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: TSVA214M-ALXHZ

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Traccel valve family, valve construction A, two valve bodies, 14" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
49	33	30	20.5	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 8b was ceiling-suspended; the rectangular duct was attached to the unit with (10) #14 self tapping screws, (3) on each long side, (2) on each short side, approximately 1'' in from the corners and in the center. The duct was fastened top and bottom 1 5/8'' 12 ga strut; the strut was attached to the duct, 24'' from the center of the valve with (6) #14 self tapping screws per strut spaced approximately 2'' on center. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48'' and hung approximately 24'' down. Rod stiffeners and rod stiffening clips were used. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT9

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVDF08M-AAEHO-PSL / EXVDF08M-AAHHO

Product Construction Summary:

Body, cone and hardware - aluminum with PVDF coating; PFA-coated 316 stainless steel shaft.

Options / Component Summary:

Celeris valve family, valve construction D, single valve with welded circular flange, 8" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
17	23.5	10.3	14.6	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 9 was ceiling-suspended. Duct was attached to the unit with (6) 1/4'' diameter, grade 5, bolts spaced at 60 degrees. The flanges attached to the duct with (4) #14 self tapping screws spaced at 90 degrees. The duct was attached to the top of the strut with steel 3/4'' wide, 24ga strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 self tapping screws per side, spaced at 90 degrees. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48'' apart and 24'' down from the fixture. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT10

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVB114M-SMEHO

Product Construction Summary:

Body and cone - aluminum with baked phenolic coating; PFA-coated 316 stainless steel shaft

Options / Component Summary:

Celeris valve family, valve construction B, single valve body, 14" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

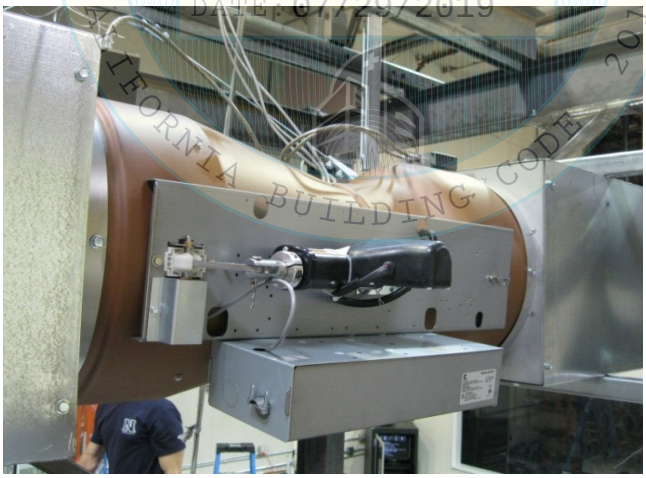
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
24	30	13.9	21.4	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:



UUT 10 was ceiling-suspended with square flange mount; the flange was attached to the unit with (4) #14 self tapping screws spaced at 90 degrees. The duct was attached to the flange with (8) #14 self tapping screws, spaced 1'' in from the corners. The duct was fastened top and bottom 1 5/8'' 12 ga strut; the strut was attached to the duct, 24'' from the center of the valve with (6) #14 self tapping screws per strut spaced approximately 2'' on center. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48'' and hung approximately 24'' down. Rod stiffeners and rod stiffening clips were used. 22'' lengths of 1 5/8'' 12 ga strut with (3) Power Strut PS 3500, A307, rod stiffening clips. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable, 2 per drop rod, angled at approximately 45 degrees horizontally and vertically.

UUT11

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: CSVA108M-ACNDZ

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Constant Volume valve family, valve construction A, one valve body, 8" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
6	23.5	7.9	12	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 11 was mounted in a vertical orientation, in-line with duct. Unit was attached to one square and one round duct using (4) #14 self tapping screws per each duct spaced evenly at 90 degrees. The top duct was attached to the DCL steel shake table interface frame with 24 ga steel strap (3) #14 screws spaced at 90 degrees. The bottom duct was attached to the interface frame with angle (8) #14 self tapping screws. This lateral bracing of the assembly was provided at 8-feet on-center. The interface frame was mounted to the shake table using M12 threaded rod at approximately 8-inches on-center.

UUT12

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: CSVA114M-ACNDZ

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Constant Volume valve family, valve construction A, one valve body, 14" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

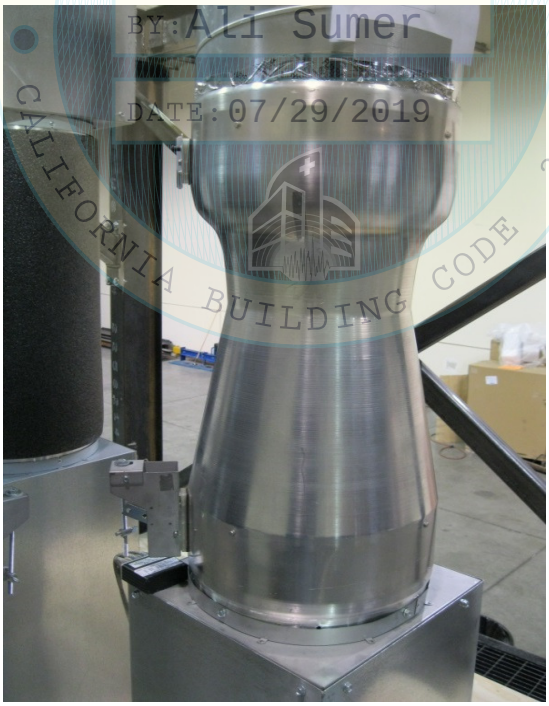
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
12	30	14	19.5	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:



UUT 12 was mounted in a vertical orientation, in-line with duct. Unit was attached to one square and one round duct using (4) #14 self tapping screws per each duct spaced evenly at 90 degrees. The top duct was attached to the DCL steel shake table interface frame with 24 ga steel strap (3) #14 screws spaced at 90 degrees. The bottom duct was attached to the interface frame with angle (8) #14 self tapping screws. This lateral bracing of the assembly was provided at 8-feet on-center. The interface frame was mounted to the shake table using M12 threaded rod at approximately 8-inches on-center.

UUT13

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: CSVA210M-ACNDZ

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Constant Volume valve family, valve construction A, two valve bodies, 10" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
18	24	20	14	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UTU 13 was mounted in a vertical orientation, in-line with duct. Unit was attached to two rectangular ducts using (1) #14 screws per each duct spaced at 1'' in from the corners and in the middle on the long side. The top duct was attached to the DCL steel shake table interface frame with 24ga steel strap (3) #14 self tapping screws. The bottom duct was attached to the interface frame with angle (8) #14 self tapping screws. This lateral bracing of the assembly was provided at 8-feet on-center. The interface frame was mounted to the shake table using M12 threaded rod at approximately 8-inches on-center.

UUT15a

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVD108M-AAEUC

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Celeris valve family, valve construction D, single valve body, 8" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

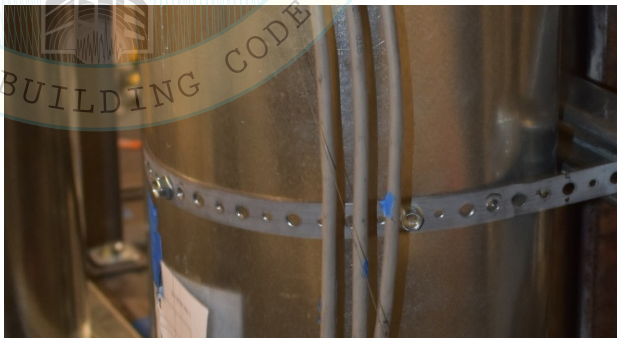
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
11	23.5	10.3	14.6	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:



UUT 15a was mounted in a vertical orientation, in-line with 8'' diameter duct. The unit was attached to the ducts using (2) DBK-1-08 drawband clamps. The duct was attached to the DCL steel shake table interface frame with 3/4'' wide, 24ga hanger strap and (3) #14 self tapping screws spaced 90 degrees apart. The strap was spaced 12'' from the edge of the duct. Strap attached to the DCL interface fixture with (2) 1/4'' diameter, grade 5, bolts and washers with a 1.5'' x 1.5'' x 3/16'' low carbon steel plate washer.

UUT15a

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVD108M-AMEUC

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Celeris valve family, valve construction D, single valve body, 8" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
11	23.5	10.3	14.6	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 15a was mounted in a vertical orientation, in-line with 8'' diameter duct. The unit was attached to the ducts using (2) DBK-1-08 drawband clamps. The duct was attached to the DCL steel shake table interface frame with 3/4'' wide, 24ga hanger strap and (3) #14 self tapping screws spaced 90 digress apart. The strap was spaced 12'' from the edge of the duct. The strap attached to the DCL interface fixture with (2) 1/4'' diameter, grade 5, bolts and washers with a 1.5'' x 1.5'' x 3/16'' low carbon steel plate washer.

UUT16

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: HSVAF08-LIXDZ-SFB

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Theris valve family, valve construction A, single valve body, 8" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

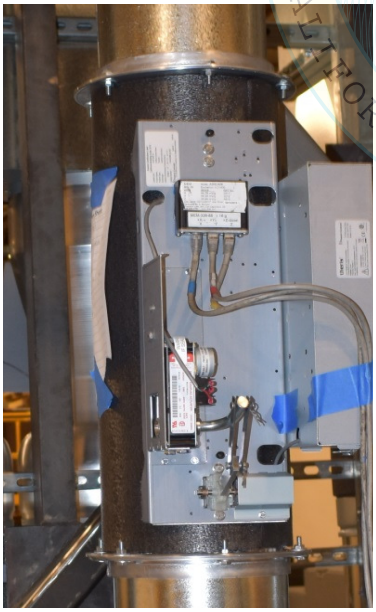
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
11	23.5	10.3	14.6	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:



UUT 16 was mounted in a vertical orientation, in-line with 8'' diameter duct. The unit was attached to the duct using (6) 1/4'' diameter, grade 5, bolts spaced 60 degrees apart. The duct was attached to the DCL steel shake table interface frame with 3/4'' wide, 24ga hanger strap and (3) #14 self tapping screws spaced 90 digress apart. The strap was spaced 12'' from the edge of the duct. Strap attached to the DCL interface fixture with (2) 1/4'' diameter, grade 5, bolts and washers with a 1.5'' x 1.5'' x 3/16'' low carbon steel plate washer.

UUT17

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: MAVC114M-ALEUZ

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Theris valve family, valve construction C, single valve body, 14" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

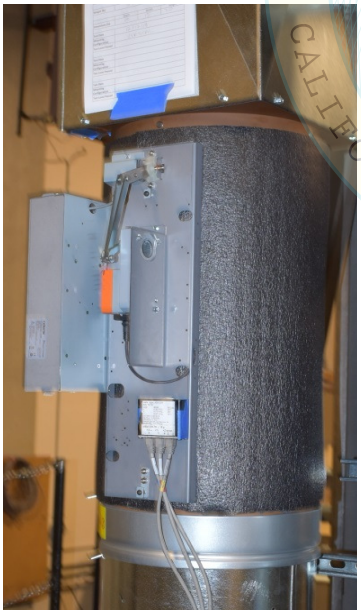
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
24	30	13.9	21.4	N/A	N/A	N/A

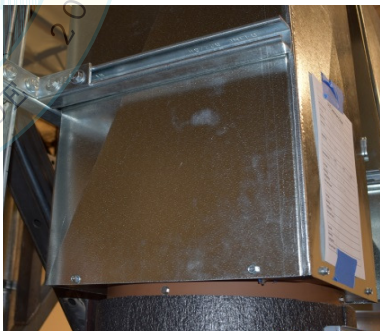
Seismic Test Parameters

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	1.67	0.67

Unit Mounting Description:



bottom attachment



top attachment

UUT 17 was mounted in a vertical orientation, in-line with 14'' diameter duct on one side and square duct on the other. The unit was attached to the round duct using a DBK-1-14 drawband clamp. The unit was attached to the square duct with (8) #14 self tapping screws spaced 1'' from the corner. The round duct was attached to the DCL steel shake table interface frame with 3/4'' wide, 24ga hanger strap and (3) #14 self tapping screws spaced 90 degrees apart. Attachment points were spaced 12'' from the edge of the duct. The square duct was attached to the DCL steel shake table interface frame with (8) #14 self tapping screws, spaced 2'' on center, into (2) 1 5/8'' 12 ga strut. Strut was attached with (4) 3/8'' diameter, grade 5 bolts via angle bracket.

UUT18

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: TSVA214M-ALXUZ

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Traccel valve family, valve construction A, dual valve body, 14" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
49	33	30	24.1	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 18 was mounted in a vertical orientation, in-line with rectangular duct. The unit was attached to the square duct with (10) #14 self tapping screws spaced 1'' from the corners and in the center of the valve in the long direction. The duct was attached to the DCL steel shake table interface frame with (8) #14 self tapping screws, spaced 2'' on center, into (2) 1 5/8'' 12 ga strut. Strut was attached with (4) 3/8'' diameter, grade 5 bolts via angle bracket and spaced 12'' from the edge of the valve.

UUT19

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVA212M-ANEDO

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Celeris valve family, valve construction A, dual valve body, 12" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
36	30	24.5	18.4	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 19 was mounted in a vertical orientation, in-line with rectangular duct. The unit was attached to the square duct with (10) #14 self tapping screws spaced 1'' from the corners and in the center of the valve in the long direction. The duct was attached to the DCL steel shake table interface frame with (8) #14 self tapping screws, spaced 2'' on center, into (2) 1 5/8'' 12 ga strut. Strut was attached with (4) 3/8'' diameter, grade 5 bolts via angle bracket and spaced 12'' from the edge of the valve.

UUT20

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: EXVA214M-AMEUO-PSL

Product Construction Summary:

Body and cone -- uncoated aluminum; Shaft -- uncoated 316 stainless steel

Options / Component Summary:

Celeris valve family, valve construction A, dual valve body, 14" valve

Note: The UUT was operational before, during and after shaking. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
49	33	30	21.4	N/A	N/A	N/A

Seismic Test 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	1.67	0.67

Unit Mounting Description:

UUT 20 was mounted in a vertical orientation, in-line with rectangular duct. The unit was attached to the square duct with (10) #14 self tapping screws spaced 1'' from the corners and in the center of the valve in the long direction. The duct was attached to the DCL steel shake table interface frame with (8) #14 self tapping screws, spaced 2'' on center, into (2) 1 5/8'' 12 ga strut. Strut was attached with (4) 3/8'' diameter, grade 5 bolts via angle bracket and spaced 12'' from the edge of the valve.