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

Manufacturer's Technical Representative: Lloyd Le

Mailing Address: 75 Discovery Way, Acton, MA 01720

Telephone: (978) 795-3442 Email: lle@phoenixcontrols.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: Ceiling suspended (horizontal and vertical)

Applicant Information

Applicant Company Name: Dynamic Certification Laboratories

Contact Person: Joseph L. La Brie, S.E.

Mailing Address: 1315 Greg Street, Suite 109

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

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2013.

Signature of Applicant: Date: 6/16/16

Title: Partner Company Name: Dynamic Certification Laboratories

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

Company Name: Dynamic Certification Laboratories

Name: Dr. Ahmad Itani, S.E. California License Number: SE-5220

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

Telephone: (775) 358-5085 Email: Itani@shaketest.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: Dynamic Certification Laboratories

Contact Name: Kelly Laplace, Project Manager

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

Telephone: (775) 358-5085 Email: kelly@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) = See attachments

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

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, 2010 ☐ Yes ☒ No

List of Attachments Supporting Special Seismic Certification

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

☐ Other(s) (Please Specify):

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

Signature: Date: August 9, 2016

Print Name: Timothy J. Piland Title: SSE

Special Seismic Certification Valid Up to : S_{DS} (g) = See Above z/h = 1

Condition of Approval (if applicable):

Certified Components

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

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

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

Mounting Description: Horizontal in-line duct mounted (ceiling suspended) or vertical in-line duct mounted, using no-flange, no-flange with drawband clamps, square flange, or welded flange mount.

Product Line	Valve Family	Model Number	Valve Description	Dimensions (inches)			Weight (lb)	Horizontal In-Line Mounting			Vertical In-Line Mounting	Sds (g), z/h=1 [3]	Fp/Wp	Unit
				Depth	Width	Height		Threaded Rod Hanger Diameter (in)	Diagonal Cable Brace Diameter (in)	Max. Hanger Rod Spacing (in)	**Max. Vertical Duct Support Spacing (ft)**			
Accel II Airflow Control Valves	CSV/CEV Constant Volume	CSVA108M-ACNHZ	Single 8"	23.5	7.9	12.0	6	3/8	1/8	48	8	2.5	1.88	UUT1a
		CSVA108M-ACNDZ	Single 8"				6							UUT11
		CSVA108M-ACNHZ	Single 8"				8							UUT1b
		CSVA108M-ACNHZ-SFB	Single 8"				8							UUT1c
		CxVxx08x-ACNxZ	Single 8"	23.5 to 30.0	7.9 to 14.0	12.0 to 19.5	6 to 16							Interpolated
		CxVxx08x-ACNxZ-SFB	Single 8"											Interpolated
		CxVxx10x-ACNxZ	Single 10"											Interpolated
		CxVxx10x-ACNxZ-SFB	Single 10"											Interpolated
		CxVxx12x-ACNxZ	Single 12"											Interpolated
		CxVxx12x-ACNxZ-SFB	Single 12"											Interpolated
		CxVxx14x-ACNxZ	Single 14"											Interpolated
		CxVxx14x-ACNxZ-SFB	Single 14"											Interpolated
		CSVA114M-ACNHZ	Single 14"	30.0	14.0	19.5	12							UUT3a
		CSVA114M-ACNDZ	Single 14"				12							UUT12
		CSVA114M-ACNHZ	Single 14"				15							UUT3b
		CSVA114M-ACNHZ-SFB	Single 14"				16							UUT3c
		CSVA210M-ACNHZ	Dual 10"	24.0	20.0	14.0	18							UUT4
		CSVA210M-ACNDZ	Dual 10"	24.0	20.0	14.0	18							UUT13
		CxVx210x-ACNxZ	Dual 10"	24.0 to 33.0	20.0 to 30.0	14.0 to 18.5	18 to 33							Interpolated
		CxVx212x-ACNxZ	Dual 12"									2.5 or 1.97[1]	1.88 / 1.48	Interpolated
		CxVx214x-ACNxZ	Dual 14"											Interpolated
		CSVA214M-ACNHZ	Dual 14"	33.0	30.0	18.5	33					2.5	1.88	UUT2
		CSVA214M-ACNUZ	Dual 14"	33.0	30.0	18.5	33					1.97	1.48	UUT14
	PSV/PEV Pneumatic[2]	PxVxx08x-xxxxx-xxx	Single 8"	23.5 to 33.0	10.3 to 30.0	14.6 to 20.5	9 to 49	3/8	1/8	48	Not Permitted	2.5	1.88	Extrapolated
		PxVxx10x-xxxxx-xxx	Single 10"											Extrapolated
		PxVxx12x-xxxxx-xxx	Single 12"											Extrapolated
		PxVxx14x-xxxxx-xxx	Single 14"											Extrapolated
		PxVx210x-xxxxx-xxx	Dual 10"											Extrapolated
		PxVx212x-xxxxx-xxx	Dual 12"											Extrapolated
		PxVx214x-xxxxx-xxx	Dual 14"											Extrapolated

Notes:

1. 12" and 14" constant volume dual valves are certified for Sds 1.97 g in vertical in-line duct orientation and Sds 2.5 g in horizontal orientation.
2. PSV/PEV are similar to the MAV/EXV valves tested in UUT7b, UUT7c and UUT9, and ony differ by removal of the potentiometer.
3. Certification level is limited to the lower rating of either the Certified Components, as listed here, or the subcomponents, as listed on the Certified Subcomponent tables.

Certified Components (Continued)

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

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

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

Mounting Description: Horizontal in-line duct mounted (ceiling suspended) or vertical in-line duct mounted, using no-flange, no-flange with drawband clamps, square flange, or welded flange mount.

Product Line	Valve Family	Model Number	Valve Description	Dimensions (inches)			Weight (lb)	Horizontal In-Line Mounting			Vertical In-Line Mounting	Sds (g), z/h=1 [2]	Fp/Wp	Unit
				Depth	Width	Height		Threaded Rod Hanger Diameter (in)	Diagonal Cable Brace Diameter (in)	Max. Hanger Rod Spacing (in)	**Max. Vertical Duct Support Spacing (ft)**			
Accel II Airflow Control Valves	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	3/8	1/8	48	Not Permitted	2.5	1.88	Extrapolated
		BxVxx10x-xxxxx-xxx	Single 10"											Extrapolated
		BxVxx12x-xxxxx-xxx	Single 12"											Extrapolated
		BxVxx14x-xxxxx-xxx	Single 14"											Extrapolated
		BxVx210x-xxxxx-xxx	Dual 10"											Extrapolated
		BxVx212x-xxxxx-xxx	Dual 12"											Extrapolated
		BxVx214x-xxxxx-xxx	Dual 14"											Extrapolated
	MAV/EXV Analog / Celeris	EXVA108M-AMEHO (Celeris)	Single 8"	23.5	10.3	14.6	9	3/8	1/8	48	Not Permitted	2.5	1.88	UUT5a
		EXVA108M-AMEHO (Celeris)	Single 8"				11							UUT5b
		EXVA108M-ALEHZ-SFB (Celeris)	Single 8"				11							UUT5c
		EXVA108M-AIEHZ-SFB (Celeris)	Single 8"				11							UUT5d
		EXVDF08M-AAEHO-PSL / EXVDF08M-AAHHO (Analog)	Single 8"	23.5	10.3	14.6	17							UUT9
		MAV/EXVxx08x-xxxxx-xxx (Analog / Celeris)	Single 8"	23.5 to 30.0	10.3 to 13.9	14.6 to 21.4	9 to 20							Interpolated
		MAV/EXVxx10x-xxxxx-xxx (Analog / Celeris)	Single 10"											Interpolated
		MAV/EXVxx12x-xxxxx-xxx (Analog / Celeris)	Single 12"											Interpolated
		MAV/EXVxx14x-xxxxx-xxx (Analog / Celeris)	Single 14"											Interpolated
		EXVA114M-AMEHO (Celeris)	Single 14"	30.0	13.9	21.4	20							UUT6a
		EXVA114M-AMEHO (Celeris)	Single 14"	30.0	13.9	21.4	23							UUT6b
		EXVB114M-SMEHO (Celeris)	Single 14"	30.0	13.9	21.4	24							UUT10
		EXVA210M-AMEHC (Celeris)	Dual 10"	25.0	20.0	16.5	30							UUT7a
		EXVA210M-ANEHO (Celeris)	Dual 10"				30							UUT7b
		EXVA210M-ANEHC (Celeris)	Dual 10"				30							UUT7c
		EXVA210M-AEEHC (Analog)	Dual 10"				30							UUT7d
		MAV/EXVx210x-xxxxx-xxx (Analog / Celeris)	Dual 10"	25.0 to 33.0	20.0 to 30.0	16.5 to 20.5	30 to 49							Interpolated
		MAV/EXVx212x-xxxxx-xxx (Analog / Celeris)	Dual 12"											Interpolated
		MAV/EXVx214x-xxxxx-xxx (Analog / Celeris)	Dual 14"											Interpolated
		EXVA214M-AMEHC (Celeris)	Dual 14"	33.0	30.0	20.5	49							UUT8a

Notes:

1. BSV/BEV are similar to the MAV/EXV Analog/Celeris valves, except only differ by removal of the potentiometer and/or controller.
2. Certification level is limited to the lower rating of either the Certified Components, as listed here, or the subcomponents, as listed on the Certified Subcomponent tables.

Certified Components (Continued)

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

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

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

Mounting Description: Horizontal in-line duct mounted (ceiling suspended) or vertical in-line duct mounted, using no-flange, no-flange with drawband clamps, square flange, or welded flange mount.

Product Line	Valve Family	Model Number	Valve Description	Dimensions (inches)			Weight (lb)	Horizontal In-Line Mounting			Vertical In-Line Mounting	Sds (g), z/h=1 [2]	Fp/Wp	Unit
				Depth	Width	Height		Threaded Rod Hanger Diameter (in)	Diagonal Cable Brace Diameter (in)	Max. Hanger Rod Spacing (in)	**Max. Vertical Duct Support Spacing (ft)**			
Accel II Airflow Control Valves	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	3/8	1/8	48	Not Permitted	2.5	1.88	Extrapolated
		HxVxx10x-xxxxx-xxx	Single 10"											Extrapolated
		HxVxx12x-xxxxx-xxx	Single 12"											Extrapolated
		HxVxx14x-xxxxx-xxx	Single 14"											Extrapolated
		HSVA114M-ALOHZ-SFB	Single 14"	30.0	13.9	21.4	24							UUT6c
		HxVx210x-xxxxx-xxx	Dual 10"	25.0 to 33.0	20.0 to 30.0	16.5 to 20.5	30 to 49							Extrapolated
		HxVx212x-xxxxx-xxx	Dual 12"											Extrapolated
		HxVx214x-xxxxx-xxx	Dual 14"											Extrapolated
	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	3/8	1/8	48	Not Permitted	2.5	1.88	Extrapolated
		TxVxx10x-xxxxx-xxx	Single 10"											Extrapolated
		TxVxx12x-xxxxx-xxx	Single 12"											Extrapolated
		TxVxx14x-xxxxx-xxx	Single 14"											Extrapolated
		TxVx210x-xxxxx-xxx	Dual 10"	25.0 to 33.0	20.0 to 30.0	16.5 to 20.5	30 to 49							Extrapolated
		TxVx212x-xxxxx-xxx	Dual 12"											Extrapolated
		TxVx214x-xxxxx-xxx	Dual 14"											Extrapolated
		TSVA214M-ALXHZ	Dual 14"	33.0	30.0	20.5	49							UUT8b

Notes:

1. HSV/HEV and TSV/TEV valves are similar to the MAV/EXV valves, and ony differ by the type of controller (Theris controller tested in UUT6c and Traccel controller tested in UUT8b).

2. Certification level is limited to the lower rating of either the Certified Components, as listed here, or the subcomponents, as listed on the Certified Subcomponent tables.

SPECIAL SEISMIC CERTIFICATION
Nomenclature Chart: Phoenix Controls Accel II Airflow Control Valves

DCL Dynamic Certification Laboratories

EXV A 1 14 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 Supply Valve
EXV	Analog Exhaust Valve
HSV	Theris Supply Valve Healthcare
HEV	Theris Exhaust Valve Healthcare
TSV	Traccel Supply Valve Life Science
TEV	Traccel Exhaust Valve Life Science
MAV	Celeris Supply Valve
EXV	Celeris Exhaust Valve

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; BXV: Floating point

A = Analog - Pneumatic

E = Analog - High-speed electric

L = Digital - Low-speed electric

M = Digital - High-speed electric

N = Digital - Pneumatic

Z = Base upgradeable - Low Speed Electric (2-10VDC)

Q = Base upgradeable - Medium Speed Electric (2-10VDC)

R = Base upgradeable - Medium Speed Electric (4-20 mA)

S = Base upgradeable - Medium Speed Electric (0.5-10VDC)

VALVE CONTROLLER DESIGNATION

N = No electronics (Traccel/ Theris Tracking Valve or CV)

E = Celeris/ Analog Electronic Controller (Analog without boosters only)

E = 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

P = Analog: Associated or standalone valve without pneumatic solenoids; All: for flow feedback function only

FAIL SAFE POSITION

C = Normally closed valve

O = Normally open valve

Z = Not applicable

VALVE ORIENTATION

H = Horizontal

U = Vertical up flow

D = Vertical downflow

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

EM = 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

REFERENCE ONLY

Special Seismic Certification
Certified Options

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

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

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

Mounting Description: Horizontal in-line duct mounted (ceiling suspended) or vertical in-line duct mounted, using no-flange, no-flange with drawband clamps, square flange, or welded flange mount.

Valve Family

Allowable Value	Allowable Value Description	Sds (g), z/h=1	Fp/Wp	Unit
CSV/CEV	Constant Volume	2.5	1.88	UUT1-4, UUT11-13
PSV/PEV	Pneumatic			Interpolated[1]
BSV/BEV	Base Upgradeable			Interpolated[1]
MAV/EXV	Analog			UUT7d, UUT9
MAV/EXV	Celeris			UUT5; UUT6a, b; UUT7a-c; UUT8a, UUT10
HSV/HEV	Theris			UUT6c
TSV/TEV	Traccel			UUT8b

Valve Construction

Allowable Value	Allowable Value Description	Sds (g), z/h=1	Fp/Wp	UUT
A	Body and cone - uncoated aluminum; shaft - uncoated 316 stainless steel	2.5	1.88	UUT1-8, UUT11-13
B	Body and cone with baked phenolic coating; PFA-coated 316 stainless steel shaft			UUT10
C	Body, cone and hardware with baked phenolic/epoxy phenolic coating; PFA-coated 316 stainless steel shaft			Interpolated[2]
D	Body, cone and hardware with PVDF coating; PFA-coated 316 stainless steel shaft			UUT9

Number of Valve Bodies

Allowable Value	Allowable Value Description	Sds (g), z/h=1	Fp/Wp	UUT
F	Single valve with welded circular flange	2.5	1.88	UUT9
1	One valve body (single, no flange)			UUT1, UUT3, UUT5, UUT6, UUT10-12
2	Two valve bodies (dual)	2.5 or 1.97[3]	1.88 / 1.48	UUT2, UUT4, UUT7-8, UUT13-14
3	Three valve bodies (triple)			Extrapolated[4]
4	Four valve bodies (quad)			Extrapolated[4]

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. 12" and 14" dual, triple and quad valves are certified for Sds 1.97 g in vertical in-line duct orientation and Sds 2.5 g in horizontal orientation. 10" dual, triple and quad valves are certified for Sds 2.5 g in horizontal or vertical in-line duct orientation.

4. 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 field (no components are different).

REFERENCE ONLY

Special Seismic Certification
Certified Options

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

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

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

Mounting Description: Horizontal in-line duct mounted (ceiling suspended) or vertical in-line duct mounted, using no-flange, no-flange with drawband clamps, square flange, or welded flange mount.

Valve Size

Allowable Value	Allowable Value Description	Sds (g), z/h=1	Fp/Wp	Unit
08	8" valve	2.5	1.88	UUT1, UUT5, UUT9, UUT11
10	10" valve			UUT4, UUT7, UUT12
12	12" valve	2.5 or 1.97[1]	1.88 / 1.48	Interpolated
14	14" valve			UUT2, UUT3, UUT6, UUT8, UUT10-11, UUT14

Flow/Pressure Operating Range

Allowable Value	Allowable Value Description	Sds (g), z/h=1	Fp/Wp	Unit
M	Medium Pressure	2.5	1.88	UUT1 - UUT13
L	Low Pressure			Extrapolated[2]

Valve Design

Allowable Value	Allowable Value Description	Sds (g), z/h=1	Fp/Wp	Unit
A	Conical-shape diffuser (Accel II)	2.5	1.88	UUT1-9, UUT11-13
S	Standard - Shut-Off Valve			UUT10
L	Low Leakage - Shut-Off Valve			Extrapolated[3]

Control Type

Allowable Value	Allowable Value Description	Sds (g), z/h=1	Fp/Wp	Unit
C	Constant Volume	2.5	1.88	UUT1-4, UUT11-13
P	Pneumatic			Interpolated[4]
B	Base Upgradeable - Pneumatic			Interpolated[4]
F	Fixed, field adjustable to increase/decrease flow			Interpolated[5]
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, UUT6c, UUT8b
M	Digital - High-speed electric			UUT5a, UUT5b, UUT6a, UUT6b, UUT7a, UUT8a, UUT10
N	Digital - Pneumatic			UUT7b, UUT7c
Z	Base Upgradeable - Low Speed Electric (2-10 VDC)			Interpolated[6]
Q	Digital - Pneumatic - Med. Speed Electric (2-10 VDC)			Interpolated[6]
R	Digital - Pneumatic - Med. Speed Electric (4-20 mA)			Interpolated[6]
S	Digital - Pneumatic - Med. Speed Electric (0.5-10 VDC)			Interpolated[6]

Notes

1. 12" and 14" dual, triple and quad valves are certified for Sds 1.97 g in vertical in-line duct orientation and Sds 2.5 g in horizontal orientation.
2. Extrapolated option is identical to tested option.
3. Low Leakage Shut-Off valve is the same construction as the Standard Shut-Off Valve.
4. Pneumatic and base-upgradeable pneumatic control types are represented by the valves tested for UUT7b and UUT7c except the controller and/or potentiometer are removed.
5. Interpolated option is identical to the tested UUT1-4 option, but installed on the BxV family valves.
6. Interpolated option is identical to the tested UUT5d option, but installed on the BxV family valves.

REFERENCE ONLY

Special Seismic Certification
Certified Options

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

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

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

Mounting Description: Horizontal in-line duct mounted (ceiling suspended) or vertical in-line duct mounted, using no-flange, no-flange with drawband clamps, square flange, or welded flange mount.

Valve Controller Designation

Allowable Value	Manufacturer	Allowable Value Description	Sds (g), z/h=1	Fp/Wp	Unit
N	n/a	No electronics	2.5	1.88	UUT1-4
E	Phoenix Controls	Celeris/Analog Electronic Controller (Analog without boosters only)			UUT5, UUT6a, UUT6b, UUT7a, b, c; UUT8a, UUT10
E	Phoenix Controls	LonMarkElectronic Valve - Controlling Valve of Tracking Pair			UUT7d
X	Phoenix Controls	LonMark Electronic Valve - Controlling valve of tracking pair with expanded features			UUT8b
O	Phoenix Controls	LonMark Supply only Valve			UUT6c
A	Phoenix Controls	BACnet Electronic Valve - Controlling Valve of Tracking Pair			Interpolated[1]
B	Phoenix Controls	BACnet Electronic Valve - Controlling Valve of Tracking Pair with expanded features			Interpolated[1]
Y	Phoenix Controls	BACnet TX-RTN - Supply controlling primary exhaust and return			Interpolated[1]
Z	Phoenix Controls	BACnet TX-EXH - Supply controlling primary exhaust and locally controlled exhaust			Interpolated[1]
C	Phoenix Controls	BACnet Supply only Valve			Interpolated[1]
D	Phoenix Controls	BACnet Exhaust only Valve			Interpolated[1]
H	Phoenix Controls	Hood exhaust valve with pressure switch			UUT9
F	Phoenix Controls	Flow feedback in small black box			Interpolated[2]
P	Phoenix Controls	Analog; Associated or standalone valve without pneumatic solenoids; All: for flow feedback function only			Interpolated[3]

Notes:

1. Software change only from tested LonMark valves. LonMark and BACnet are the two Data Communication Protocol for Building Automation and Control Networks. The Phoenix Controls Traccell and Theris controller can either communicate through LonMark or BACnet protocol.
2. Smaller version of UUT9.
3. Software change only from UUT9.

REFERENCE ONLY

Special Seismic Certification
Certified Options

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

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

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

Mounting Description: Horizontal in-line duct mounted (ceiling suspended) or vertical in-line duct mounted, using no-flange, no-flange with drawband clamps, square flange, or welded flange mount.

Valve Orientation

Allowable Value	Allowable Value Description	Sds (g), z/h=1	Fp/Wp	Unit
H	Horizontal	2.5	1.88	UUT1-10
U	Vertical upflow	2.5 or 1.97[1]	1.88 / 1.48	UUT14
D	Vertical downflow			UUT11-13

Fail Safe Position

Allowable Value	Allowable Value Description	Sds (g), z/h=1	Fp/Wp	Unit
C	Normally closed valve	2.5	1.88	UUT7a, c, d; UUT8a
O	Normally open valve			UUT5a-b; UUT6a-b; UUT7b, UUT9-10
Z	Not applicable			UUT1-4, UUT5c-d; UUT6c, UUT8b

Valve Options

Allowable Value	Allowable Value Description	Sds (g), z/h=1	Fp/Wp	Unit
EVI	Exhaust valve with insulation and blocks	2.5	1.88	Interpolated[2]
IBO	Insulation blocks only, no insulation			Interpolated[2]
PSL	Pressure Switch, low limit			UUT9
SFB	Square flange on both ends of single body valve			UUT1c, UUT3c, UUT5c-d; UUT6c
SFX	Square flange on one end of single body valve; inlet on exhaust; discharge on supply			Interpolated[3]

Notes:

1. 12" and 14" dual, triple and quad valves are certified for Sds 1.97 g in vertical in-line duct orientation and Sds 2.5 g in horizontal orientation. 10" dual, triple and quad valves and all sizes of single valves are certified for Sds 2.5 g in horizontal and vertical in-line duct orientation.

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

3. Within the confines of the tested options.

REFERENCE ONLY

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Controller Board						
Model Number	**Manufacturer**	**Description**	**Material**	**Sds (g), z/h=1** [1]	**Fp/Wp**	**Unit**
C2V LOSEA	Phoenix Controls	Low Speed	Printed circuit board with electronic components	2.5	1.88	UUT5c-d
THERIS		Low Speed				UUT6c
TRACCEL		Low Speed				UUT8b
LVC HISEA		High Speed				UUT5a-b, UUT6a-b, UUT7a, UUT8a, UUT10
AVC HISEA		High Speed Analog				UUT7d
C2V PNU		Pneumatic				UUT7b-c
VLV CNTRL ANALOG		Pneumatic Analog				UUT9

Note:

1. Certification level is limited to the lower rating of either the Certified Subcomponents, as listed here, or the components, as listed on the Certified Component tables.

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Actuators

Model Number	Manufacturer	Description	Material	Sds (g), z/h=1 [8]	Fp/Wp	Unit
n/a	Phoenix Controls	Manual control actuator	Galvanized carbon steel	2.5	1.88	UUT1a-c, UUT2, UUT3a-c, UUT4, UUT11-13[1]
490-000-073		High Speed Electric Linear Actuator	Plastic and carbon steel			UUT5b, UUT6a, UUT7d
490-000-092		High Speed Electric Linear Actuator	Plastic and carbon steel			Interpolated [2]
DH12-17W41	Thomson	High Speed Electric Linear Actuator	Plastic and carbon steel			UUT8a
DH12-17W42		High Speed Electric Linear Actuator	Plastic and carbon steel			UUT5a, UUT6b, UUT7a, UUT10
GMB24-3 PH	Belimo	On/off Floating Point Control, Non-Spring Return, Direct Coupled, 24 V	Plastic and carbon steel			UUT8b
GMB24-SR		On/off Floating Point Control, Non-Spring Return, Direct Coupled, 24 V	Plastic and carbon steel			Interpolated [3]
AMQBX24-MFT		On/off Floating Point Control, Non-Spring Return, Direct Coupled, 24 V	Plastic and carbon steel			Interpolated [4]
AMB24-3.1 PH		On/off Floating Point Control, Non-Spring Return, 24 V	Plastic and carbon steel			UUT6c
AMB24-SR		On/off Floating Point Control, Non-Spring Return, 24 V	Plastic and carbon steel			Interpolated [5]
NMQBX24-MFT		On/off Floating Point Control, Non-Spring Return, 24 V	Plastic and carbon steel			Interpolated [6]
NMB24-3.1 PH		On/off Floating Point Control, Non-Spring Return, Direct Coupled, 24 V	Plastic and carbon steel			UUT5d
NMB24-SR		On/off Floating Point Control, Non-Spring Return, Direct Coupled, 24 V	Plastic and carbon steel			Interpolated [7]
ML6174B2019	Honeywell	On/off Floating Point Control, Non-Spring Return Damper Actuator, 24 V	Plastic and carbon steel			UUT5c
MCP-0335	KMC	3" Pneumatic control actuator (open/closed position)	Plastic and carbon steel			UUT7c, UUT9
MCP-0435		4" Pneumatic control actuator (open/closed position)	Plastic and carbon steel			UUT7b

Pressure Switch

Model Number	Manufacturer	Description	Material	Sds (g), z/h=1 [8]	Fp/Wp	Unit
1227D1/A, 0.30" WC PF	Honeywell	Pressure Switch	Plastic, silicon, and steel	2.5	1.88	UUT9

Notes:
1. Manual control actuators were also tested in a vertical orientation to Sds 2.5 g in UUT11-13.
2. 490-000-092 is mecahnically identical to 490-000-073, except for software
3. GMB24-SR is identical to GMB24-3 PH, except for software.
4. AMQBX24-MFT is mechanically identical to GMB24-3 PH, but slightly smaller and with different software.
5. AMB24-SR is identical to AMB24-3.1 PH, except for software.
6. NMQBX24-MFT is mechanically identical to AMB24-3.1 PH, except for software.
7. NMB24-SR is identical to NMB24-3.1 PH, except for software.
8. Certification level is limited to the lower rating of either the Certified Subcomponents, as listed here, or the components, as listed on the Certified Component tables.

Special Seismic Certification: Summary of Tested Units

DCL Dynamic Certification Laboratories

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 or vertical upflow/downflow orientation, controllers, actuators and pressure switch.

Mounting Description: Horizontal in-line duct mounted (ceiling suspended) or vertical in-line duct mounted, using no-flange, no-flange with drawband clamps, square flange, or welded flange mount.

Model Number	Valve Family	Valve Description	Dimensions (inches)			Weight (lb)	**Horizontal In-Line Mounting**			**Vertical In-Line Mounting**	Mounting	Sds (g), z/h=1	Fp/Wp	Unit
			Depth	Width	Height		Threaded Rod Hanger Diameter (in)	Diagonal Cable Brace Diameter (in)	Max. Hanger Rod Spacing (in)	**Vertical Duct Support Spacing (ft)**				
CSVA108M-ACNHZ	CSV/CEV Constant Volume	Single 8"	23.5	7.9	12.0	6	3/8	1/8	48	Not Tested in Vertical Position	Horizontal in-line duct mounted	2.5	1.88	UUT1a
CSVA108M-ACNHZ	CSV/CEV Constant Volume	Single 8"	23.5	7.9	12.0	8	3/8	1/8	48			2.5	1.88	UUT1b
CSVA108M-ACNHZ-SFB	CSV/CEV Constant Volume	Single 8"	23.5	7.9	12.0	8	3/8	1/8	48			2.5	1.88	UUT1c
CSVA214M-ACNHZ	CSV/CEV Constant Volume	Dual 14"	33.0	30.0	18.5	33	3/8	1/8	48			2.5	1.88	UUT2
CSVA114M-ACNHZ	CSV/CEV Constant Volume	Single 14"	30.0	14.0	19.5	12	3/8	1/8	48			2.5	1.88	UUT3a
CSVA114M-ACNHZ	CSV/CEV Constant Volume	Single 14"	30.0	14.0	19.5	15	3/8	1/8	48			2.5	1.88	UUT3b
CSVA114M-ACNHZ-SFB	CSV/CEV Constant Volume	Single 14"	30.0	14.0	19.5	16	3/8	1/8	48			2.5	1.88	UUT3c
CSVA210M-ACNHZ	CSV/CEV Constant Volume	Dual 10"	24.0	20.0	14.0	18	3/8	1/8	48			2.5	1.88	UUT4
EXVA108M-AMEHO (Celeris)	MAV/EXV Analog / Celeris	Single 8"	23.5	10.3	14.6	9	3/8	1/8	48			2.5	1.88	UUT5a
EXVA108M-AMEHO (Celeris)	MAV/EXV Analog / Celeris	Single 8"	23.5	10.3	14.6	11	3/8	1/8	48			2.5	1.88	UUT5b
EXVA108M-ALEHZ-SFB (Celeris)	MAV/EXV Analog / Celeris	Single 8"	23.5	10.3	14.6	11	3/8	1/8	48			2.5	1.88	UUT5c
EXVA108M-AIEHZ-SFB (Celeris)	MAV/EXV Analog / Celeris	Single 8"	23.5	10.3	14.6	11	3/8	1/8	48			2.5	1.88	UUT5d
EXVA114M-AMEHO (Celeris)	MAV/EXV Analog / Celeris	Single 14"	30.0	13.9	21.4	20	3/8	1/8	48			2.5	1.88	UUT6a
EXVA114M-AMEHO (Celeris)	MAV/EXV Analog / Celeris	Single 14"	30.0	13.9	21.4	23	3/8	1/8	48			2.5	1.88	UUT6b
HSVA114M-ALOHZ-SFB	HSV/HEV Theris	Single 14"	30.0	13.9	21.4	24	3/8	1/8	48			2.5	1.88	UUT6c
EXVA210M-AMEHC (Celeris)	MAV/EXV Analog / Celeris	Dual 10"	25.0	20.0	16.5	30	3/8	1/8	48			2.5	1.88	UUT7a
EXVA210M-ANEHO (Celeris)	MAV/EXV Analog / Celeris	Dual 10"	25.0	20.0	16.5	30	3/8	1/8	48			2.5	1.88	UUT7b
EXVA210M-ANEHC (Celeris)	MAV/EXV Analog / Celeris	Dual 10"	25.0	20.0	16.5	30	3/8	1/8	48			2.5	1.88	UUT7c
EXVA210M-AEEHC (Analog)	MAV/EXV Analog / Celeris	Dual 10"	25.0	20.0	16.5	30	3/8	1/8	48			2.5	1.88	UUT7d
EXVA214M-AMEHC (Celeris)	MAV/EXV Analog / Celeris	Dual 14"	33.0	30.0	20.5	49	3/8	1/8	48			2.5	1.88	UUT8a
TSVA214M-ALXHZ	TSV/TEV Traccel1	Dual 14"	33.0	30.0	20.5	49	3/8	1/8	48			2.5	1.88	UUT8b
EXVDF08M-AAEHO-PSL / EXVDF08M-AAHHO (Analog)	MAV/EXV Analog / Celeris	Single 8"	23.5	10.3	14.6	17	3/8	1/8	48			2.5	1.88	UUT9
EXVB114M-SMEHO (Celeris)	MAV/EXV Analog / Celeris	Single 14"	30.0	13.9	21.4	24	3/8	1/8	48			2.5	1.88	UUT10
CSVA108M-ACNDZ	CSV/CEV Constant Volume	Single 8"	23.5	7.9	12.0	6	Not Tested in Horizontal Position			8	Vertical in-line duct mounted	2.5	1.88	UUT11
CSVA114M-ACNDZ	CSV/CEV Constant Volume	Single 14"	30.0	14.0	19.5	12						2.5	1.88	UUT12
CSVA210M-ACNDZ	CSV/CEV Constant Volume	Dual 10"	24.0	20.0	14.0	18						2.5	1.88	UUT13
CSVA214M-ACNUZ	CSV/CEV Constant Volume	Dual 14"	33.0	30.0	18.5	33						1.97	1.48	UUT14

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, one valve body, 8" valve, medium pressure operating range, conical shaped diffuser, constant volume control type, no electronics, horizontal orientation, n/a fail safe position. Unit was tested with insulation and insulation blocks.

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

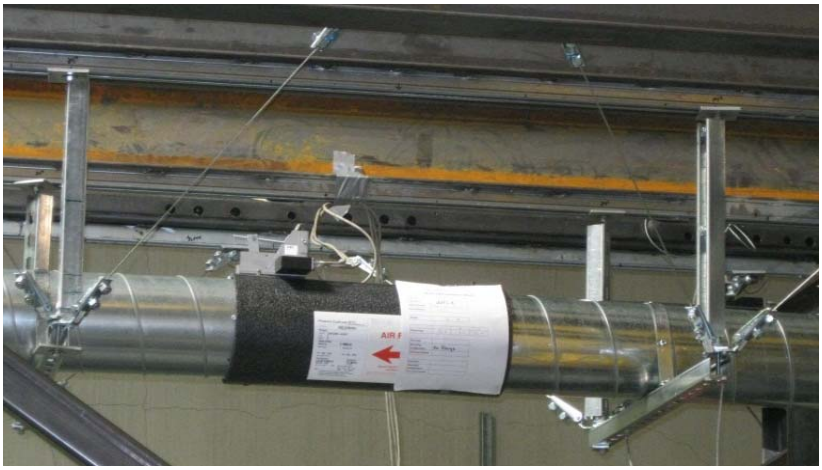
UUT Properties

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:



Unit ceiling-suspended with no-flange mount. Duct was attached to the unit with four #14 SMS, evenly spaced. The duct was attached to the top of the strut with steel strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 sheet metal screws per side, evenly spaced. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, constant volume control type, no electronics, horizontal orientation, n/a fail safe position. Unit was tested with insulation blocks but no insulation.

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:

Unit ceiling-suspended with no flange, mounted to duct with drawband clamps. The duct was attached to the top of the strut with steel strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 sheet metal screws per side, evenly spaced. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, constant volume control type, no electronics, horizontal orientation, n/a fail safe position. Square flange on both ends of single body valve. Unit was tested with insulation blocks but no insulation.

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

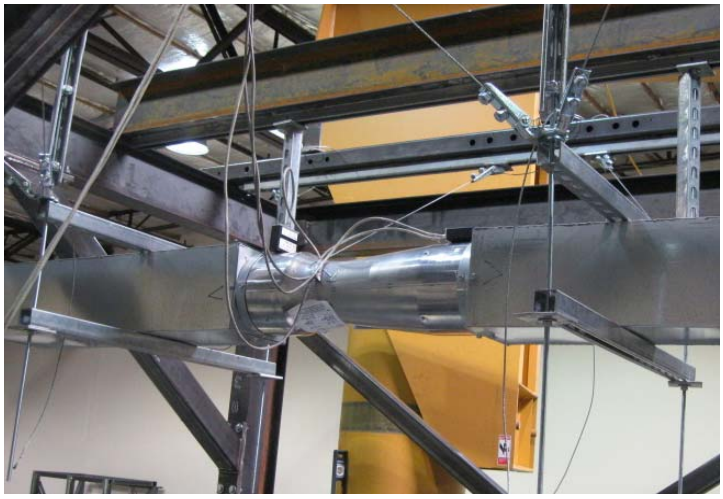
UUT Properties

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:



Unit ceiling-suspended with square flange mount; the flange was attached to the unit with four #14 sheet metal screws, evenly spaced; the duct was attached to the flange with four #14 sheet metal screws, one on each side. The duct was sandwiched top and bottom by slotted 1-5/8-inch strut; the strut was attached to the duct, 24-inches from the center of the valve, with two #14 sheet metal screws per strut. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, constant volume control type, no electronics, horizontal orientation, n/a fail safe position. Unit was tested with insulation and insulation blocks.

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:

Unit ceiling-suspended with square flange mount; the square duct was attached to the unit with ten #14 sheet metal screws, 3 on each long side, 2 on each short side. The duct was sandwiched top and bottom by slotted 1-5/8-inch strut; the strut was attached to the duct, 24-inches from the center of the valve, with six #14 sheet metal screws per strut. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, constant volume control type, no electronics, horizontal orientation, n/a fail safe position. Unit was tested with insulation and insulation blocks.

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:

Unit ceiling-suspended with no-flange mount. The duct was attached to the unit with four #14 SMS, evenly spaced. The duct was attached to the top of the strut with steel strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 sheet metal screws per side, evenly spaced. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, constant volume control type, no electronics, horizontal orientation, n/a fail safe position. Unit was tested with insulation blocks but no insulation.

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:

Unit ceiling-suspended with no flange, mounted to duct with drawband clamps. The duct was attached to the top of the strut with steel strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 sheet metal screws per side, evenly spaced. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, constant volume control type, no electronics, horizontal orientation, n/a fail safe position. Square flange on both ends of single body valve. Unit was tested with insulation blocks but no insulation.

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:

Unit ceiling-suspended with square flange mount; the flange was attached to the unit with four #14 sheet metal screws, evenly spaced; the duct was attached to the flange with eight #14 sheet metal screws, two on each side. The duct was sandwiched top and bottom by slotted 1-5/8-inch strut; the strut was attached to the duct, 24-inches from the center of the valve, with two #14 sheet metal screws per strut. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, constant volume control type, no electronics, horizontal orientation, n/a fail safe position. Unit was tested with insulation and insulation blocks.

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:

Unit ceiling-suspended with square flange mount; the square duct was attached to the unit with ten #14 sheet metal screws, 3 on each long side, 2 on each short side. The duct was sandwiched top and bottom by slotted 1-5/8-inch strut; the strut was attached to the duct, 24-inches from the center of the valve, with six #14 sheet metal screws per strut. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, digital high speed electric control 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
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:

Unit ceiling-suspended with no-flange mount. The duct was attached to the unit with four #14 sheet metal screws, evenly spaced. The duct was attached to the top of the strut with steel strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 sheet metal screws per side, evenly spaced. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, digital high speed electric control type, Celeris electronic controller designation, horizontal orientation, normally open valve fail safe position. Phoenix Controls 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
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:

Unit ceiling-suspended with no flange, mounted to duct with drawband clamps. The duct was attached to the top of the strut with steel strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 sheet metal screws per side, evenly spaced. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, digital low speed electric control type, Celeris electronic controller designation, horizontal orientation, n/a valve fail safe position, square flange on both ends of single body valve. C2V LOSEA controller, Honeywell 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
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:

Unit ceiling-suspended with square flange mount; the flange was attached to the unit with four #14 sheet metal screws, evenly spaced; the duct was attached to the flange with four #14 sheet metal screws, one on each side. The duct was sandwiched top and bottom by slotted 1-5/8-inch strut; the strut was attached to the duct, 24-inches from the center of the valve, with two #14 SMS per strut. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, IP54 Electric Actuator with fail-to-last position and BxV floating point control type, Celeris electronic controller designation, horizontal orientation, n/a valve fail safe position, square flange on both ends of single body valve. C2V LOSEA controller, Belimo NMB 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
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:

Unit ceiling-suspended with square flange mount; the flange was attached to the unit with four #14 sheet metal screws, evenly spaced; the duct was attached to the flange with four #14 sheet metal screws, one on each side. The duct was sandwiched top and bottom by slotted 1-5/8-inch strut; the strut was attached to the duct, 24-inches from the center of the valve, with two #14 sheet metal screws per strut. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, horizonal 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:

Unit ceiling-suspended with no-flange mount. The duct was attached to the unit with four #14 sheet metal screws, evenly spaced. The duct was attached to the top of the strut with steel strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 sheet metal screws per side, evenly spaced. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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:

Unit ceiling-suspended with no flange, mounted to duct with drawband clamps. The duct was attached to the top of the strut with steel strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 sheet metal screws per side, evenly spaced. The strut was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, digital low speed electric controller type, LonMark supply only valve designation, horizontal orientation, n/a valve fail safe position, square flange on both ends of single body valve. THERIS controller, Belimo AMB 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
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:

Unit ceiling-suspended with square flange mount; the flange was attached to the unit with four #14 sheet metal screws, evenly spaced; the duct was attached to the flange with eight #14 sheet metal screws, two on each side. The duct was sandwiched top and bottom by slotted 1-5/8-inch strut; the strut was attached to the duct, 24-inches from the center of the valve, with two #14 sheet metal screws per strut. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, digital high speed electric controller type, Celeris electronic controller designation, horizontal orientation, normally closed valve fail safe position. Thomson DH12-1742 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:

Unit ceiling-suspended with square flange mount; the square duct was attached to the unit with ten #14 sheet metal screws, 3 on each long side, 2 on each short side. The duct was sandwiched top and bottom by slotted 1-5/8-inch strut; the strut was attached to the duct, 24-inches from the center of the valve, with six #14 sheet metal screws per strut. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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.

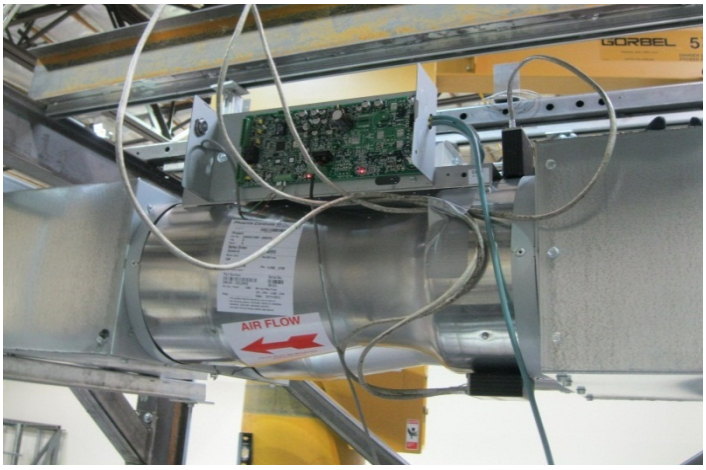
UUT Properties

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:



Unit ceiling-suspended with square flange mount; the square duct was attached to the unit with ten #14 sheet metal screws, 3 on each long side, 2 on each short side. The duct was sandwiched top and bottom by slotted 1-5/8-inch strut; the strut was attached to the duct, 24-inches from the center of the valve, with six #14 sheet metal screws per strut. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, digital pneumatic controller type, Celeris electronic controller designation, horizontal orientation, normally closed valve fail safe position. 3" 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:

Unit ceiling-suspended with square flange mount; the square duct was attached to the unit with ten #14 sheet metal screws, 3 on each long side, 2 on each short side. The duct was sandwiched top and bottom by slotted 1-5/8-inch strut; the strut was attached to the duct, 24-inches from the center of the valve, with six #14 sheet metal screws per strut. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, Celeris/Analog electronic controller / LonMark Electronic valve-controlling valve of tracking pair controller designation, horizontal orientation, normally closed valve fail safe position. Phoenix Controls 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:

Unit ceiling-suspended with square flange mount; the square duct was attached to the unit with ten #14 sheet metal screws, 3 on each long side, 2 on each short side. The duct was sandwiched top and bottom by slotted 1-5/8-inch strut; the strut was attached to the duct, 24-inches from the center of the valve, with six #14 sheet metal screws per strut. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, digital high speed electric controller type, Celeris electronic controller designation, horizontal orientation, normally closed valve fail safe position. Thomson DH12-1741 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
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:

Unit ceiling-suspended with square flange mount; the square duct was attached to the unit with ten #14 sheet metal screws, 3 on each long side, 2 on each short side. The duct was sandwiched top and bottom by slotted 1-5/8-inch strut; the strut was attached to the duct, 24-inches from the center of the valve, with six #14 sheet metal screws per strut. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, digital low speed electric controller type, LonMark Electronic valve - controlling valve of tracking pair with expanded features controller designation, horizontal orientation, n/a valve fail safe position. TRACCEL controller, Belimo GMB 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
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:

Unit ceiling-suspended with square flange mount; the square duct was attached to the unit with ten #14 sheet metal screws, 3 on each long side, 2 on each short side. The duct was sandwiched top and bottom by slotted 1-5/8-inch strut; the strut was attached to the duct, 24-inches from the center of the valve, with six #14 sheet metal screws per strut. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, BACnet electronic valve - controlling valve of tracking pair controller designation (also, hood exhaust valve with pressure switch), horizontal orientation, normally open valve fail safe position, pressure switch - low limit. 3" 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
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:

Unit ceiling-suspended with welded flange mount. The unit's welded flange was attached to the duct interface flange with six 1/4-inch diameter Grade 5 bolts per flange. Each duct interface flange was attached to the duct with four #14 sheet metal screws, evenly spaced. The duct was attached to top of strut with steel strap using 3/8-inch diameter Grade 5 bolts. The strap was attached to the duct with three #14 sheet metal screws per side, evenly spaced. Strut was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, standard shut-off valve, digital high speed electric controller type, Celeris/Analog 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
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:

Unit ceiling-suspended with square flange mount; the flange was attached to the unit with four #14 sheet metal screws, evenly spaced; the duct was attached to the flange with eight #14 sheet metal screws, two on each side. The duct was sandwiched top and bottom by slotted 1-5/8-inch strut; the strut was attached to the duct, 24-inches from the center of the valve, with two #14 sheet metal screws per strut. The unit was suspended with 3/8-inch diameter threaded rod spaced at 48-inches and attached to the DCL shake table interface frame with spring nuts. Rod stiffeners and rod stiffening clips were used. Lateral bracing consisted of Mason SCB hangers with 1/8-inch diameter cable.

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, medium pressure operating range, conical shaped diffuser, constant volume control type, no electronics, vertical downflow orientation, n/a fail safe position. Unit was tested without insulation.

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:

Unit mounted in a vertical orientation, in-line with duct. Unit was attached to one square and one round duct using four #14 screws per each duct. The top duct was attached to the DCL steel shake table interface frame with steel strap and #14 screws. The bottom duct was attached to the interface frame with angle and #14 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, medium pressure operating range, conical shaped diffuser, constant volume control type, no electronics, vertical downflow orientation, n/a fail safe position. Unit was tested without insulation.

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

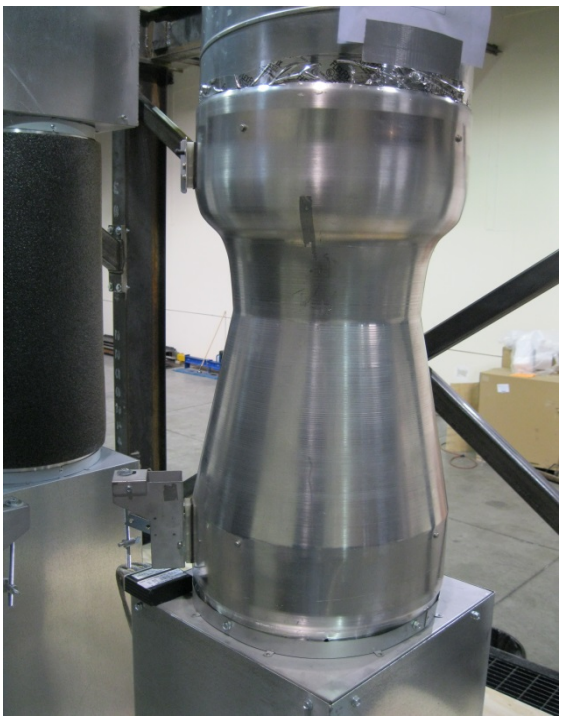
UUT Properties

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:



Unit mounted in a vertical orientation, in-line with duct. Unit was attached to one square and one round duct using four #14 screws per each duct. The top duct was attached to the DCL steel shake table interface frame with steel strap and #14 screws. The bottom duct was attached to the interface frame with angle and #14 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, medium pressure operating range, conical shaped diffuser, constant volume control type, no electronics, vertical downflow orientation, n/a fail safe position. Unit was tested with insulation and insulation blocks.

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:

Unit mounted in a vertical orientation, in-line with duct. Unit was attached to two square ducts using ten #14 screws per each duct. The top duct was attached to the DCL steel shake table interface frame with steel strap and #14 screws. The bottom duct was attached to the interface frame with angle and #14 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.

UUT14

UNIT UNDER TEST (UUT) Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Phoenix Controls

Product Line: Accel II Airflow Control Valves

Model Number: CSVA214M-ACNUZ

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, medium pressure operating range, conical shaped diffuser, constant volume control type, no electronics, vertical upflow orientation, n/a fail safe position. Unit was tested with insulation and insulation blocks.

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:

Unit mounted in a vertical orientation, in-line with duct. Unit was attached to two square ducts using ten #14 screws per each duct. The top duct was attached to the DCL steel shake table interface frame with steel strap and #14 screws. The bottom duct was attached to the interface frame with angle and #14 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.