



# APPLICATION FOR PREAPPROVAL SPECIAL SEISMIC CERTIFICATION OF EQUIPMENT AND COMPONENTS

For Office Use Only

APPLICATION NO.

OSP – 0216-10

Check whether application is: NEW  RENEWAL

1.0 Dri-Steem Dave Schwaller  
*Manufacturer* *Manufacturer's Technical Representative*

14949 Technology Dr. Eden Prairie, MN 55344  
*Mailing Address*

952.906.4042 Dave.schwaller@dristeem.com  
*Telephone* *E-mail Address*

2.0 Humidification Systems Humidification Systems  
*Product Name* *Product Type*

VLC, STS, VM, XT, Mini-Bank, Ultra-Sorb (See Attachment for complete listing)  
*Product model No (List all unique product identification numbers and/or serial numbers)*

*General Description: Humidification systems and steam dispersion units – See Attachment. Approval is limited to tested configurations.*

3.0 Tobolski Watkins Engineering, Inc. Matthew Tobolski, Ph.D., P.E.  
*Applicant Company Name* *Contact Person*

3710 Ruffin Road, San Diego, CA 92123  
*Mailing Address*

858-381-5843 mtobolski@tobolskiwatkins.com  
*Telephone* *E-mail Address*

I hereby agree to reimburse the Office of Statewide Health Planning and Development for the actual costs incurred by the department for review.

  
*Signature of Applicant*  
 President and CEO  
*Title*

05/06/2011  
*Date*  
Tobolski Watkins Engineering, Inc.  
*Company Name*



**4.0 Registered Design Professional Preparing the Report**

**Tobolski Watkins Engineering Inc.**

*Company Name*

Matthew J. Tobolski, Ph.D, P.E.

*Contact Name*

C 72806

*California License Number*

3710 Ruffin Road, San Diego, CA 92123

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*Telephone*

[mtobolski@tobolskiwatkins.com](mailto:mtobolski@tobolskiwatkins.com)

*E-mail Address*

**5.0 California Licensed Structural Engineer Review and Acceptance of the Report**

**Tobolski Watkins Engineering Inc.**

*Company Name*

Derrick A. Watkins, S.E.

*Contact Name*

S 5257

*California License Number*

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*E-mail Address*

**6.0 Anchorage Pre-Approval**

- Anchorage is pre-approved under OPA-  
(Separate application for anchorage pre-approval is required)
- Anchorage is not Pre-approved

**7.0 Certification Method**

- Testing in accordance with:
  - ICC-ES AC-156
  - Other (Please Specify):
- Analysis
- Experience data
- Combination of Testing, Analysis, and/or Experience Data (Please Specify):

**8.0 Testing Laboratory (if applicable)**

**Clark Testing**

*Company Name*

**Frank Medeiros**

*Contact Name*

1801 Rout 51, Jefferson Hills, PA 15025

*Mailing Address*

412.387.1003

*Telephone*

[fmediros@clarktesting.com](mailto:fmediros@clarktesting.com)

*E-mail:*



**9.0 Approval Parameters**

Design in accordance with ASCE 7-05 Chapter 13:  Yes  No

- Design Basis of Equipment or Components ( $F_p/W_p$ ) = **Varies (See Table 1)**
- $S_{DS}$  (Spectral response acceleration at short period) = **Varies (See Table 1)**
- $a_p$  (In-structure equipment or component amplification factor) = **2.5g (Duct/AHU mounted); 1.0 (all others)**
- $R_p$  (Equipment or component response modification factor) = **6.0 (Duct/AHU mounted); 2.5 (all others)**
- $I_p$  (Importance factor) = **1.5**
- $z/h$  (Height factor ratio) = **1.0**
- Equipment or Component fundamental period(s) = **[See Attachment]**
- Building period limits (if any) = **None**
- Overall dimensions and weight (or range thereof) = **[See Attachment]**

Equipment or Components @ grade designed in accordance with ASCE 7-05 Chapter 15:  Yes  No

- Design Basis of Equipment or Components ( $V/W$ ) =
- $S_{DS}$  (Spectral response acceleration at short period) =
- $S_1$  (Spectral response acceleration at 1 second period) =
- $R$  (Response modification coefficient) = **1.0**
- $\Omega_0$  (System overstrength factor) = **1.0**
- $C_d$  (Deflection amplification factor) = **1.0**
- $I_p$  (Importance factor) = **1.5**
- Height to Center of Gravity above base =
- Equipment or Component fundamental period(s) =           Sec
- Overall dimensions and weight (or range thereof) =

Tank(s) designed in accordance with ASME BPVC, 2007:  Yes  No

**10.0 List of attachments supporting the special seismic certification of equipment or components:**

- Test Report
- Drawings
- Manufacturer's Catalog
- Calculations
- Others (Please Specify):

**11.0 OSHPD Approval (For Office Use Only)**



Signature & Date  
**M. R. Karim, SHFR**

Name & Title

10/7/2011

December 31, 2016

Approval Expiration Date

$S_{DS}$  (g) = **See Section 9.0**  $z/h = 1.0$

Special Seismic Certification Valid Up to

Condition of Approval (if any): **Approval is limited to tested configuration only and does not cover installation in equipment/components with vibration isolators.**



Table 1

**Special Seismic Certification  
UUT Summary Sheet**

TWEI Project No.:2010-0138-CO-001

**Manufacturer:** Dri-Steam Inc.

**Model Line:** Humidification Systems

UUT	Unit Description	Report	Mounting	Location	S <sub>DS</sub>	z/h	I <sub>p</sub>
1	VLC 2-1	EL: 9706	Floor	Clark	2.5	1.0	1.5
2	VLC 2-1 (w/ weather enclosure)	EL: 9706	Floor	Clark	2.5	1.0	1.5
3	VLC 100-4	EL: 9706	Floor	Clark	2.5	1.0	1.5
4	VLC 100-4 (w/ weather enclosure)	EL: 9706	Floor	Clark	2.5	1.0	1.5
5	VLC Control Panel XL	EL: 9675	Wall	Clark	2.5	1.0	1.5
6	STS 25S	EL: 9706	Floor	Clark	2.5	1.0	1.5
7	STS 800C	EL: 9706	Floor	Clark	2.5	1.0	1.5
8	XT-5	EL: 9675	Wall	Clark	2.0	1.0	1.5
9	XTSB-20	EL: 9675	Wall	Clark	2.5	1.0	1.5
10a	XT-50	EL: 9675	Wall	Clark	2.5	1.0	1.5
12	XT-200	EL: 9675	Wall	Clark	2.0	1.0	1.5
10b	XTSB-50	EL: 9675	Wall	Clark	2.5	1.0	1.5
11	XTSB-50	EL: 9675	Wall	Clark	2.0	1.0	1.5
13	VM-2	EL: 9675	Wall	Clark	2.5	1.0	1.5
14	VM-34	EL: 9675	Wall	Clark	2.5	1.0	1.5
15	Mini-Bank - 12"x12"	EL: 9767	Duct	Clark	2.5	1.0	1.5
16	Mini-Bank - 24"x48"	EL: 9767	Duct	Clark	2.5	1.0	1.5
17	Mini-Bank - 12"x12"	EL: 9767	AHU	Clark	2.5	1.0	1.5
18	Mini-Bank - 24"x48"	EL: 9767	AHU	Clark	2.5	1.0	1.5
19	Ultra-Sorb LH - 12"x12"	EL: 9767	AHU	Clark	2.5	1.0	1.5
20	Ultra-Sorb LV - 12"x12"	EL: 9767	AHU	Clark	2.5	1.0	1.5
21	Ultra-Sorb XV - 12"x12"	EL: 9767	AHU	Clark	2.5	1.0	1.5
22	Ultra-Sorb LH - 80"x80"	EL: 9767	AHU	Clark	2.5	1.0	1.5
23	Ultra-Sorb LV - 80"x80"	EL: 9767	AHU	Clark	2.0	1.0	1.5
24	Ultra-Sorb XV - 80"x80"	EL: 9767	AHU	Clark	2.0	1.0	1.5
25	Ultra-Sorb LH - 12"x12"	EL: 9767	Duct	Clark	2.5	1.0	1.5
26	Ultra-Sorb LV - 12"x12"	EL: 9767	Duct	Clark	2.5	1.0	1.5
27	Ultra-Sorb XV - 12"x12"	EL: 9767	Duct	Clark	2.5	1.0	1.5

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**Table 2**

**Special Seismic Certification  
Certified Product Matrix**

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** DRI-STEEM Corporation

**Model Line:** Vaporstream VLC and Control Panel

**Certified Product Construction Summary:**  
Constructed of a light gauge stainless steel enclosure.

**Certified Options Summary:**  
All components are made by Dri-Steam unless otherwise noted. NEMA-4 or NEMA-12 control cabinet (see Table 4 for certified options within control cabinet): Attached or remote mounted. CHROMALOX: Electric heating elements; JOHNSON CONTROLS: Temp sensor; Water level controller, water overflow port, over-temp thermostat, DI fill float valve assembly, steam outlet and weather enclosure.

**Certified Mounting Summary:**  
Floor mounted (rigid) on steel support legs with plate steel seismic cross bracing on all sides. SEOR to specify anchorage.

**Building Code:** CBC 2010

**Seismic Certification Limits:**  $S_{DS} = 2.5 g$   $z/h = 1.0$   $I_p = 1.5$

Model Line	Model	Dimension (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
Vaporstream VLC Leg Mounted	VLC 2-1	14.75	34.00	30.31	134		1
	VLC 3-1	14.75	34.00	30.31	134		
	VLC 4-1	14.75	34.00	30.31	134		
	VLC 5-1	14.75	34.00	30.31	134		
	VLC 6-1	25.00	30.00	30.31	212		
	VLC 9-1	25.00	30.00	30.31	212		
	VLC 12-1	25.00	30.00	30.31	212		
	VLC 16-1	25.00	30.00	30.31	212		
	VLC 21-1	25.00	30.00	30.31	212		
	VLC 25-1	25.00	30.00	30.31	212		
	VLC 12-2	29.00	30.00	34.11	310		
	VLC 18-2	29.00	30.00	34.11	310		
	VLC 24-2	29.00	30.00	34.11	310		
	VLC 32-2	29.00	30.00	34.11	310		
	VLC 42-2	29.00	30.00	34.11	310		
	VLC 50-2	29.00	30.00	34.11	310		
	VLC 18-3	32.85	32.00	46.11	462		
	VLC 27-3	32.85	32.00	46.11	462		
	VLC 36-3	32.85	32.00	46.11	462		
	VLC 48-3	32.85	32.00	46.11	462		
VLC 63-3	32.85	32.00	46.11	462			
VLC 75-3	32.85	32.00	46.11	462			
VLC 24-4	40.35	32.00	46.11	563			
VLC 36-4	40.35	32.00	46.11	563			

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**Table 3**

**Special Seismic Certification  
Certified Product Matrix**

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** DRI-STEEM Corporation

**Model Line:** Vaporstream VLC in weather enclosure

**Certified Product Construction Summary:**  
VLC unit is constructed of a light gauge stainless steel enclosure. Weather enclosure constructed of structural tube steel framing Supporting both the unit on the interior and light gauge sheet metal on the exterior.

**Certified Options Summary:**  
All components are made by Dri-Steem unless otherwise noted. NEMA-4 or NEMA-12 control cabinet (see Table 4 for certified options within control cabinet): Attached or remote mounted. CHROMALOX: Electric heating elements; JOHNSON CONTROLS: Temp sensor; Water level controller, water overflow port, over-temp thermostat, DI fill float valve assembly, steam outlet and weather enclosure.

**Certified Mounting Summary:**  
Base mounted within weather enclosure mounted on structural steel tubes. SEOR to specify anchorage.

**Building Code:** CBC 2010      **Seismic Certification Limits:**  $S_{DS} = 2.5 g$        $z/h = 1.0$        $I_p = 1.5$

Model Line	Model	Dimension (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
Vaporstream VLC In weather enclosure	VLC 2-1	35.00	44.00	66.00	524		2
	VLC 3-1	35.00	44.00	66.00	524		
	VLC 4-1	35.00	44.00	66.00	524		
	VLC 5-1	35.00	44.00	66.00	524		
	VLC 6-1	35.00	44.00	66.00	607		
	VLC 9-1	35.00	44.00	66.00	607		
	VLC 12-1	35.00	44.00	66.00	607		
	VLC 16-1	35.00	44.00	66.00	607		
	VLC 21-1	35.00	44.00	66.00	607		
	VLC 25-1	35.00	44.00	66.00	607		
	VLC 12-2	39.00	44.00	66.00	740		
	VLC 18-2	39.00	44.00	66.00	740		
	VLC 24-2	39.00	44.00	66.00	740		
	VLC 32-2	39.00	44.00	66.00	740		
	VLC 42-2	39.00	44.00	66.00	740		
	VLC 50-2	39.00	44.00	66.00	740		
	VLC 18-3	44.00	44.00	66.00	927		
	VLC 27-3	44.00	44.00	66.00	927		
	VLC 36-3	44.00	44.00	66.00	927		
	VLC 48-3	44.00	44.00	66.00	927		
VLC 63-3	44.00	44.00	66.00	927			
VLC 75-3	44.00	44.00	66.00	927			
VLC 24-4	50.00	44.00	66.00	1,063			
VLC 36-4	50.00	44.00	66.00	1,063			

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**Table 5**

**Special Seismic Certification  
Certified Product Matrix**

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** DRI-STEEM Corporation

**Model Line:** STS (steam-to-steam) Humidifier

**Certified Product Construction Summary:**

Constructed of medium gauge stainless steel; carbon steel angle legs or "H" style carbon steel tubes for legs; all with plate steel seismic cross bracing.

**Certified Options Summary:**

All components are made by Dri-Steem unless otherwise noted. Copper (C) or stainless steel with (S) or without Teflon coating (SNC) heat exchangers, Vapor-logic controller, electronic water level controller, water skimmer/overflow port, attached or remote mounted NEMA-4 or NEMA-12 control cabinet (see Table 4 for certified options within control cabinet), fill float style water level assembly. JOHNSON CONTROLS: Temp. senso;. HONEYWELL: Motorized drain valve.

**Certified Mounting Summary:**

Floor mounted (rigid) on steel support legs with plate steel seismic cross bracing on all sides. SEOR to specify anchorage.

**Building Code:** CBC 2010

**Seismic Certification Limits:**

$S_{DS} = 2.5 g$

$z/h = 1.0$

$I_p = 1.5$

Model Line	Model'	Dimension (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
Standard Water Models (STS)	25 C	23.65	14.75	19.50	175		
	50 C	39.65	14.75	19.50	336		
	100 C	39.65	19.25	19.50	350		
	400 C	55.15	30.25	19.50	950		
	800 C	55.15	30.25	29.85	1,450		7
	25 S	23.65	14.75	19.50	175		6
	50 S	39.65	14.75	19.50	336		
	100 S	39.65	19.25	19.50	350		
	200 S	55.15	30.25	19.50	850		
	400 S	55.15	30.25	19.50	950		
	800 S	55.15	30.25	29.75	1,450		
	25 SNC	23.65	14.75	19.50	175		
	50 SNC	39.65	14.75	19.50	336		
	100 SNC	39.65	19.25	19.50	350		
	200 SNC	55.15	30.25	19.50	850		
	400 SNC	55.15	30.25	19.50	950		
800 SNC	55.15	30.25	29.75	1,450			

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**Table 7**

**Special Seismic Certification  
Certified Product Matrix**

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** DRI-STEEM Corporation

**Model Line:** Vapormist

**Certified Product Construction Summary:**

Constructed of a light gauge 304 or 316 stainless steel housing and plastic enclosure

**Certified Options Summary:**

All components are made by Dri-Steem unless otherwise noted. Vapor-logic controller, conductive water probes, stainless steel boiling chamber, electronic controller, fill float style water level assembly, steam outlet for distribution. CHROMALOX: Resistive electric heating elements.

**Certified Mounting Summary:**

Certified for wall mounting only.

**Building Code:** CBC 2010

**Seismic Certification Limits:**

$S_{DS} = 2.5 g$

$z/h = 1.0$

$I_p = 1.5$

Model Line	Model	Dimension (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
Vapormist (VM)	2	24.2	16.1	18.6	95		13
	4	24.2	16.1	18.6	95		
	6	24.2	16.1	18.6	122		
	8	24.2	16.1	18.6	122		
	10	24.2	16.1	18.6	139		
	12	24.2	16.1	18.6	139		
	14	24.2	16.1	18.6	139		
	16	24.2	16.1	18.6	139		
	21	24.2	16.1	18.6	152		
	25	24.2	16.1	18.6	152		
	30	24.2	16.1	18.6	156		
	34	24.2	16.1	18.6	156		14

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**UUT - 1**

**UNIT UNDER TEST (UUT)  
Summary Sheet**

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steem  
**Model Line:** Vaporstream VLC  
**Model Number:** VLC 2-1

**Product Construction Summary:**

Constructed of light gauge stainless steel with insulating pads on all sides; carbon steel angle legs with plate steel seismic cross bracing.

**Options/Subcomponent Summary:**

16x14x6 NEMA-12 control cabinet: TYCO: Transformer 120/208/240/480x24 Copper winding; MARATHON: Terminal 20A, Power Block 35A; SIEMENS: Contactor 35A; FERRAZ SHAWMUT 0.5-30A fuse; ABB: 480V breaker 4A; CONTROL PRODUCTS: Vapor-logic keypad and board. Drain valve, Fill Valve, Float Switch, Temp Sensor.

**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
125	14.75	34	30.31	15.2	20.0	>33

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Unit attached to seismic support legs which are secured to the table platen using four (4) 3/8" dia. Grade 2 bolts. One at each leg.

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UUT - 2

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Vaporstream VLC

**Model Number:** VLC 2-1 (W/ Weather Enclosure)

**Product Construction Summary:**  
The weather enclosure is constructed of structural steel tubing with light gauge stainless steel panels enclosing the unit. The unit is constructed of stainless steel with insulating pads on all sides, mounted directly onto weather enclosure steel tubing.

**Options/Subcomponent Summary:**  
16x14x6 NEMA-12 control cabinet: TYCO: Transformer 120/208/240/480x24 copper winding; MARATHON: Terminal 20A, Power Block 35A; SIEMENS: Contactor 35A; FERRAZ SHAWMUT: 0.5-30A fuse 600V; ABB: 480V 1.6A breaker; CONTROL PRODUCTS: Vapor-logic keypad and board. Drain valve, Fill Valve, Float Switch, Temp Sensor.

### UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
300	44	35	66	19.0	16.1	19.9

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Unit directly bolted to the table platen using four (4) 3/8" Dia. Grade 2 bolts. One at each leg.

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UUT - 3

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Vaporstream VLC

**Model Number:** VLC 100-4

**Product Construction Summary:**

Constructed of light gauge stainless steel with insulating pads on all sides; carbon steel angle legs with plate steel seismic cross bracing.

**Options/Subcomponent Summary:**

30x24x8 NEMA-4 control cabinet: TYCO: Transformer 120/208/240/480x24 copper winding; MARATHON: Terminal 20A, Power Block 335A; SIEMENS: Contactor 35A; FERRAZ SHAWMUT 35-60A fuse 480V; ABB: 480V 4A breaker; CONTROL PRODUCTS: Vapor-logic keypad and board. Drain valve, Fill Valve, Float Switch, Temp Sensor.

**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
435	40.35	32	46.11	15.5	20.0	>33

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Unit attached to seismic support legs which are secured to the table platen using four (4) 3/8" dia. Grade 2 bolts. One at each leg.

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**UUT - 4**

**UNIT UNDER TEST (UUT)  
Summary Sheet**

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Vaporstream VLC

**Model Number:** VLC 100-4 (w/ Weather Enclosure)

**Product Construction Summary:**  
The weather enclosure is constructed of structural steel tubing with light gauge stainless steel panels enclosing the unit. The unit is constructed of stainless steel with insulating pads on all sides, mounted directly onto weather enclosure steel tubing.

**Options/Subcomponent Summary:**  
30x24x8 NEMA-12 control cabinet: TYCO: Transformer 120/208/240/480x24 copper winding; MARATHON: Terminal 20A, Power Block 335A; SIEMENS: Contactor 35A; FERRAZ SHAWMUT 35-60A 480V fuse; ABB: 480V breaker; CONTROL PRODUCTS: Vapor-logic keypad and board. Drain valve, Fill Valve, Float Switch, Temp Sensor.

**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
655	44.0	50.0	66.0	12.4	16.1	27.3

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Unit directly bolted to the table platen using four (4) 3/8" Dia. Grade 2 bolts. One at each leg.

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**UUT - 5**

**UNIT UNDER TEST (UUT)  
Summary Sheet**

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Remote onontrol Panel

**Model Number:** Extra Extra Large (XXL) Control Panel

**Product Construction Summary:**  
NEMA 12 rated control panel

**Options/Subcomponent Summary:**  
36x30x9 NEMA-12 control cabinet: TYCO: Transformer 277x25 copper winding, 600x26 copper winding; MARATHON: Terminal 20A, Power Block 175A; SIEMENS: Contactor 35A; FERRAZ SHAWMUT 10-60A 600V fuse; ABB: 480V 4A breaker; CONTROL PRODUCTS: Vapor-logic keypad and board. Drain valve, Fill Valve, Float Switch, Temp Sensor.

**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
130	9.0	30.0	36.0	N/A	N/A	N/A

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Unit mounted to wall test fixture using four (4) 3/8" dia. Grade 2 bolts with washer, lock washer and nut.

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**UUT - 6**

**UNIT UNDER TEST (UUT)  
Summary Sheet**

TWEI Project No.: 2011-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Steam-to-Steam Humidifier

**Model Number:** STS -25 S

**Product Construction Summary:**  
Constructed of medium gauge stainless steel; carbon steel angle legs with plate steel seismic cross bracing.

**Options/Subcomponent Summary:**  
Ball float valve, stainless steel heat exchanger, automatic steam valve, and temperature sensor. Attached 12x12x6 NEMA-12 control cabinet: TYCO: Transformer 120/208/240/480x24 copper winding; MARATHON: Terminal 20A; SIEMENS: Contactor 35A; FERRAZ SHAWMUT 35-60A 480V fuse; ABB: 480V 1.6A breaker; CONTROL PRODUCTS: Vapor-logic keypad and board. Drain valve, Fill Valve, Float Switch, Temp Sensor. with Vapor-logic interface controller attached to exterior of door panel.

**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
135	23.65	14.75	19.5	15.5	20.0	>33

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>Ds</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Unit attached to seismic support legs which are secured to the table platen using a total of four (4) 3/8" dia. Grade 2 bolts; One at each leg.

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UUT - 7

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2011-0138-CO-002

**Manufacturer:** Dri-Steam

**Model Line:** Steam-to-Steam Humidifier

**Model Number:** STS-800 C

**Product Construction Summary:**  
Constructed of light gauge stainless steel mounted on "H" style carbon steel tubes with plate steel seismic cross bracing.

**Options/Subcomponent Summary:**  
Copper heat exchanger. Attached 12x12x6 NEMA-12 control cabinet: TYCO: Transformer 120/208/240/480x24 copper winding; MARATHON: Terminal 20A; SIEMENS: Contactor 35A; FERRAZ SHAWMUT 35-60A 480V fuse; ABB: 480V 4A breaker; CONTROL PRODUCTS: Vapor-logic keypad and board. Drain valve, Fill Valve, Float Switch, Temp Sensor. with Vapor-logic interface controller attached to exterior of door panel.

### UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
520	55.15	30.25	29.75	19.6	17.4	>33

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Unit attached to seismic support legs which are secured to the table platen using a total of eight (8) 3/8" dia. Grade 2 bolts; two at each leg.

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**UUT – 8**

**UNIT UNDER TEST (UUT)  
Summary Sheet**

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Electro Steam

**Model Number:** XT-5

**Product Construction Summary:**  
The unit is made of light gauge stainless steel with plastic door panels.

**Options/Subcomponent Summary:**  
Electrode heating elements, High water sensor, a fill cup, plastic steam cylinder, electronic controller and steam outlet. TYCO: Transformer 120/208/240/480x24 copper winding; MARATHON: Terminal 20A, Power Block 85A; SIEMENS: Contactor 35A; Fill Valve, with Vapor-logic interface controller attached to exterior of door panel.

**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
40	12.05	16.06	23.94	N/A	N/A	N/A

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.0g	1.0	1.5	3.2g	2.4g	1.33g	0.53g

**Test Mounting Details:**



Unit mounted to wall fixture using four (4) 3/8" dia. Grade 2 bolts with washer, lock washer and nut.

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**UUT – 9**

**UNIT UNDER TEST (UUT)  
Summary Sheet**

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Electrode Steam

**Model Number:** XTSB-20

**Product Construction Summary:**  
The unit is made of light gauge stainless steel with plastic door panels.

**Options/Subcomponent Summary:**  
TYCO: Transformer 208/240/277x120 copper winding; MARATHON: Terminal 20A, Power Block 85A; DAYTON: 106 CFM fan, MARATHON: Terminal 20A.

**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
21	12.0	15.8	10.9	N/A	N/A	N/A

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Remotely mounted from XT base steam production. XTSB unit is mounted to a wall simile through the back panel using two (2) 3/8" dia. grade 2 bolts with washer, lock washer and nut.

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**UUT – 10a/b**

**UNIT UNDER TEST (UUT)  
Summary Sheet**

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Electrode Steam

**Model Number:** XT-50 (w/ Attached XTSB-50)

**Product Construction Summary:**

Both XT and XTSB units are made of an 18 gauge 304 SS sheet metal enclosure with a plastic door.

**Options/Subcomponent Summary:**

Electrode heating elements, High water sensor, a fill cup, plastic steam cylinder, electronic controller and steam outlet. TYCO: Transformer 120/208/240/480x24 (180x120 for XTSB50); MARATHON: Terminal 65A, Power Block 85A; SIEMENS: Contactor 35A; Fill Valve, with Vapor-logic interface controller attached to exterior of door panel. DAYTON: 550 CFM fan for XTSB50; FINDER: 10A relay and base for XTSB50.

**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
126	14.1	19.2	41.9	N/A	N/A	N/A

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



XT unit is mounted to a wall simile through the back panel using four (4) 3/8" dia. grade 2 bolts with washer, lock washer and nut. XTSB unit is attached to XT unit using screws and also attached to the wall simile using two (2) 3/8" dia. grade 2 bolts.

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**UUT – 11**

**UNIT UNDER TEST (UUT)  
Summary Sheet**

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steam

**Model Line:** Electrode Steam

**Model Number:** XT-200

**Product Construction Summary:**

The XT models are made of an 18 gauge 304 SS sheet metal enclosure with plastic access doors.

**Options/Subcomponent Summary:**

Electrode heating elements, High water sensor, a fill cup, plastic steam cylinder, electronic controller and steam outlet. TYCO: Transformer 120/208/240/480x24 copper winding; MARATHON: Terminal 85A, Power Block 335A; SIEMENS: Contactor 55A; Fill Valve, with Vapor-logic interface controller.

**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
110	17.0	39.8	28.0	N/A	N/A	N/A

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.0g	1.0	1.5	3.2g	2.4g	1.33g	0.53g

**Test Mounting Details:**



Unit mounted to wall fixture using eight (8) 3/8" dia. Grade 2 bolts with washer, lock washer and nut.



**UUT - 12**

**UNIT UNDER TEST (UUT)  
Summary Sheet**

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Electrode Steam

**Model Number:** XTSB-50

**Product Construction Summary:**

The XTSB models are made of an 18 gauge 304 SS sheet metal enclosure with plastic access doors.

**Options/Subcomponent Summary:**

TYCO: Transformer 480x120 copper winding; MARATHON: Terminal 20A, Power Block 85A; DAYTON: 550 CFM fan; FINDER: 10A relay and base.

**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
38	14.1	19.1	16.1	N/A	N/A	N/A

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.0g	1.0	1.5	3.2g	2.4g	1.33g	0.53g

**Test Mounting Details:**



Remotely mounted from XT base (UUT 10a). XTSB unit is mounted to a wall simile through the back panel using two (2) 3/8" dia. grade 2 bolts with washer, lock washer and nut.

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UUT - 13

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Vapormist

**Model Number:** VM-2

**Product Construction Summary:**

The VM models are made of a light gauge stainless steel sheet metal enclosure with a thin plastic housing over entire unit.

**Options/Subcomponent Summary:**

TYCO: Transformer 120/208/240/480x24 copper winding; SEIMENS: Contractor 35A; MARATHON: Terminal 20A, Power Block 85A; CONROL PRODUCTS: Vapor-logic controller; CARLO GAVAZZI: SSR 1 pole 480V 50A, ABB: 480V 4A breaker. Drain Valve, Fill Valve, Float switch, Temp sensor. Resistive electric heating elements, conductive water probes, stainless steel boiling chamber, and steam outlet for distribution.

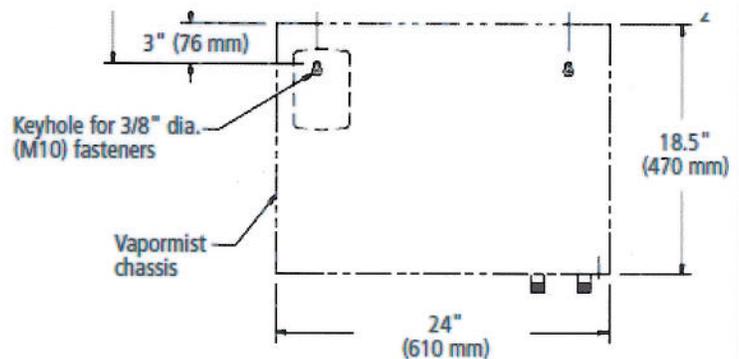
**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
55	16.1	24.2	18.6	10.4	12.4	10.0

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Unit mounted to wall test fixture using two (2) 3/8" dia. grade 2 bolts with washer, lock washer and nut.

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UUT - 14

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Vapormist

**Model Number:** VM-34

**Product Construction Summary:**

The VM models are made of a light gauge stainless steel sheet metal enclosure with a thin plastic housing over entire unit.

**Options/Subcomponent Summary:**

TYCO: Transformer 120/208/240/480x24 copper winding; SEIMENS: Contractor 55A; MARATHON: Terminal 20A, Power Block 85A; CONROL PRODUCTS: Vapor-logic controller; CARLO GAVAZZI: SSR 2 pole 480V 50A, SSR 1 pole 480 V 63A; ABB: 480V 1.6A breaker. Drain Valve, Fill Valve, Float switch, Temp sensor. Resistive electric heating elements, conductive water probes, stainless steel boiling chamber, and steam outlet for distribution.

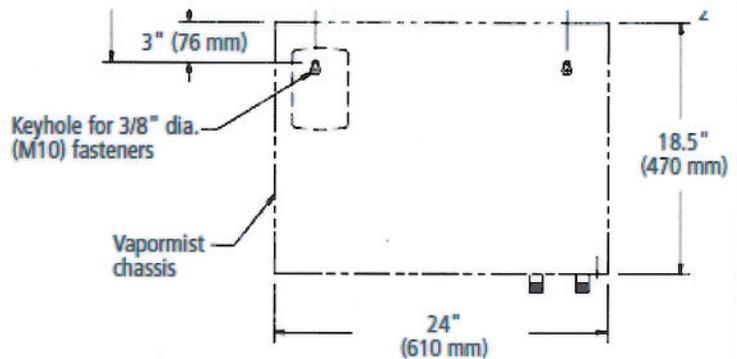
**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
75	16.1	24.2	18.6	17	12.4	15.8

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Unit mounted to wall test fixture using two (2) 3/8" dia. grade 2 bolts with washer, lock washer and nut.

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UUT - 15

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Mini-Bank

**Model Number:** 12"x12" Mini-Bank

**Product Construction Summary:**  
Constructed of square metal tubes with nozzles punched along their length. The tubes are spaced at 3" and installed horizontal to the ground and perpendicular to the duct air flow using a metal plate at one end and metal piping at the other end. The number of tubes depends upon the duct height.

**Options/Subcomponent Summary:**  
Deflector plate, multi-baffle plate, internal drying tube, steam valve, and thermal-resin tubelet

### UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
23	NA	12.0	12.0	N/A	N/A	N/A

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Mini-bank is attached to the duct through a cut opening on one side which is secured with metal cover plates and attached to duct with self-tapping screws. The opposite side is secured to the duct using three (3) 1/8" dia. screws through duct into a threaded hole in the end plate of the Mini-bank unit.

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UUT - 16

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2011-0138-CO-002

**Manufacturer:** Dri-Steem  
**Model Line:** Mini-Bank  
**Model Number:** 24"x48" Mini-Bank

**Product Construction Summary:**

Constructed of square metal tubes with nozzles punched along their length. The tubes are spaced at 3" and installed horizontal to the ground and perpendicular to the duct air flow using a metal plate at one end and metal piping at the other end. The number of tubes depends upon the duct height.

**Options/Subcomponent Summary:**

Deflector plate, multi-baffle plate, internal drying tube, steam valve, and thermal-resin tubelet

**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
40	NA	48.0	24.0	N/A	N/A	N/A

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Mini-bank is attached to the duct through a cut opening on one side and secured with cover plates over opening to duct with self-tapping screws. The opposite side is secured to the inside face of duct using six (6) 1/8" dia. screws through duct into the threaded end of the Mini-bank unit. The entire duct assembly is attached to ceiling fixture using Mason SCB/H Seismic Cable Bracing Assembly (attached).

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UUT - 17

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2011-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Mini-Bank

**Model Number:** 12" x 12" Mini-Bank

**Product Construction Summary:**  
Constructed of square metal tubes with nozzles punched along their length. The tubes are spaced at 3" and installed horizontal to the ground and perpendicular to the duct air flow using a metal plate at one end and metal piping at the other end. The number of tubes depends upon the desired height.

**Options/Subcomponent Summary:**  
Deflector plate, multi-baffle plate, internal drying tube, steam valve, and thermal-resin tubelet

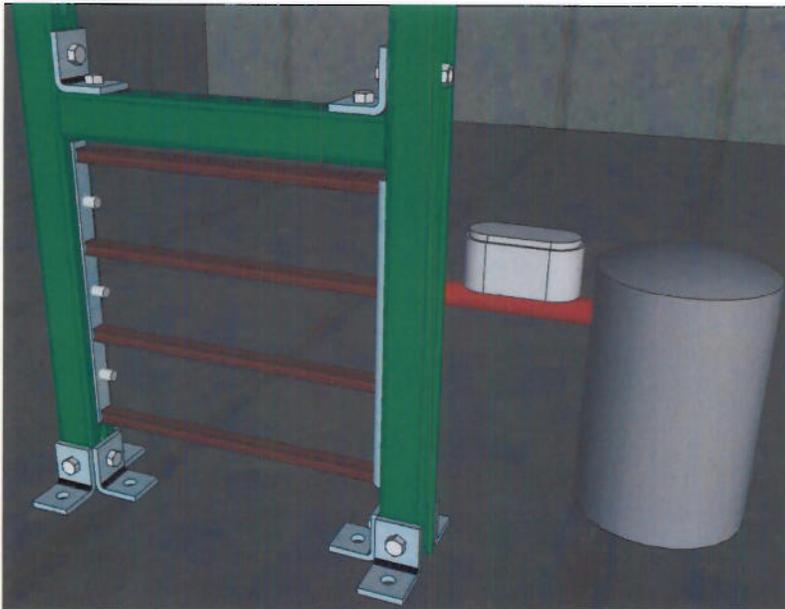
### UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
23	NA	12.0	12.0	N/A	N/A	N/A

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Mini-bank is attached to the Air Handling Unit using vertical strut-rails on both ends of the tubes and one along the top: Secured to the AHU using 3 sets of 1/4" dia self-tapping screws through 1/4" thick angles per leg; Strut-rail secured to the Mini-Bank unit using 3/8" dia. through bolts.

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UUT - 18

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2011-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Mini-Bank

**Model Number:** 24" x 48" Mini-Bank

**Product Construction Summary:**  
Constructed of square metal tubes with nozzles punched along their length. The tubes are spaced at 3" and installed horizontal to the ground and perpendicular to the duct air flow using a metal plate at one end and metal piping at the other end. The number of tubes depends upon the desired height.

**Options/Subcomponent Summary:**  
Deflector plate, multi-baffle plate, internal drying tube, steam valve, and thermal-resin tubelet

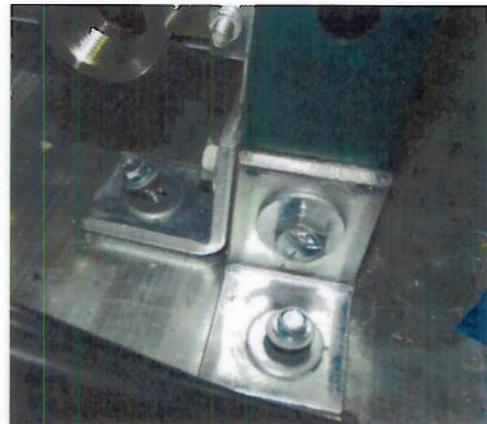
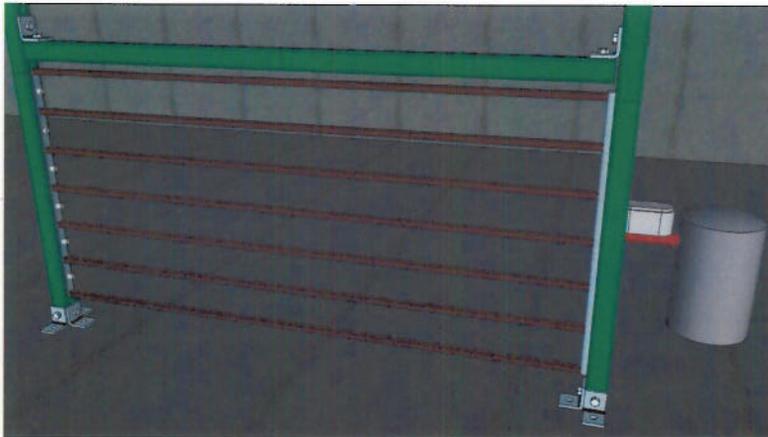
### UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
23	NA	24.0	48.0	N/A	N/A	N/A

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>Ds</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Mini-bank is attached to the Air Handling Unit using vertical strut-rails on both ends of the tubes and one along the top: Secured to the AHU using 3 sets of 1/4" dia self-tapping screws through 1/4" thick angles per leg; Strut-rail secured to the Mini-Bank unit using 3/8" dia. through bolts.

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**UUT - 19**

**UNIT UNDER TEST (UUT)  
Summary Sheet**

TWEI Project No.: 2011-0138-CO-002

**Manufacturer:** Dri-Steem  
**Model Line:** Ultra-Sorb  
**Model Number:** 12" x 12" Ultra-Sorb LV

**Product Construction Summary:**

Constructed of a light gauge steel header, sill and 2" dia. metal tubes with nozzles punched along their length. The tubes are oriented vertical to the ground and perpendicular to the duct air flow.

**Options/Subcomponent Summary:**

There are no other internal components.

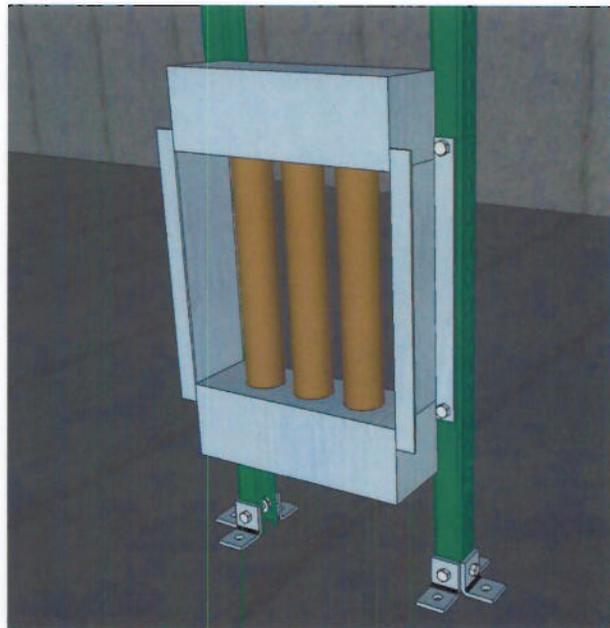
**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
27	NA	12.0	12.0	N/A	N/A	N/A

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>Ds</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Mounted on parallel strut-rails, which run from the AHU floor to ceiling, using four (4) 3/8" dia. through bolts; One at each corner. Strut-rails secured to AHU using 1/4" dia. self tapping screws through 1/4" thick angle plate.

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UUT - 20

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2011-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Ultra-Sorb

**Model Number:** 12" x 12" Ultra-Sorb LH,

**Product Construction Summary:**

Constructed of a light gauge steel header, sill and 2" dia. metal tubes with nozzles punched along their length. The tubes are oriented horizontal to the ground and perpendicular to the duct air flow.

**Options/Subcomponent Summary:**

There are no other internal components.

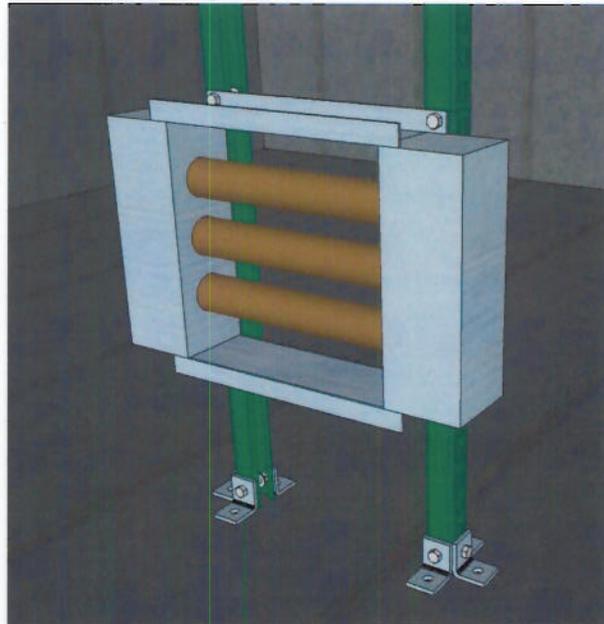
### UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
25	NA	12.0	12.0	N/A	N/A	N/A

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Mounted on parallel strut-rails, which run from the AHU floor to ceiling, using four (4) 3/8" dia. through bolts; One at each corner. Strut-rails secured to AHU using 1/4" dia. self tapping screws through 1/4" thick angle plate.

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UUT - 21

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2011-0138-CO-002

**Manufacturer:** Dri-Steem  
**Model Line:** Ultra-Sorb  
**Model Number:** 12" x 12" Ultra-Sorb XV

**Product Construction Summary:**

Constructed of a light gauge stainless steel header, sill and 2" dia. metal tubes with nozzles punched along their length. The tubes are oriented vertical to the ground and perpendicular to the duct air flow.

**Options/Subcomponent Summary:**

There are no other internal components.

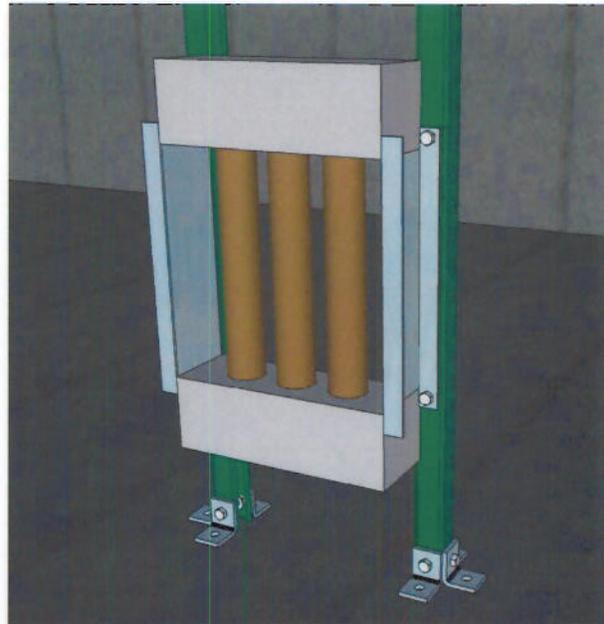
### UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
25	NA	12.0	12.0	N/A	N/A	N/A

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Mounted on parallel strut-rails, which run from the AHU floor to ceiling, using four (4) 3/8" dia. through bolts; One at each corner. Strut-rails secured to AHU using 1/4" dia. self tapping screws through 1/4" thick angle plate.

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UUT - 22

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2011-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Ultra-Sorb

**Model Number:** 144" x 144" Ultra-Sorb LV

**Product Construction Summary:**

Constructed of a light gauge steel header, sill and 2" dia. metal tubes with nozzles punched along their length. The tubes are oriented vertical to the ground and perpendicular to the duct air flow.

**Options/Subcomponent Summary:**

There are no other internal components.

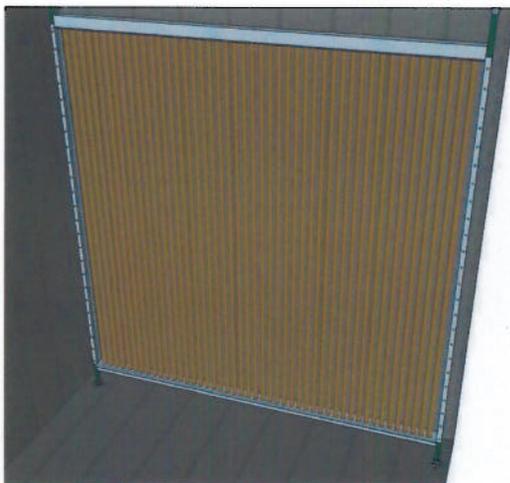
### UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
150	NA	120.0	120.0	N/A	N/A	N/A

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.0g	1.0	1.5	3.2g	2.4g	1.33g	0.53g

**Test Mounting Details:**



Strut-rails placed vertically along each side of unit and secured with 3/8" dia. bolts spaced at 6" on center. Strut-rails secured to the AHU at roof and floor level using 3 sets of 1/4" dia. self tapping screws through 1/4" thick angle plate.

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UUT - 23

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2011-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Ultra-Sorb

**Model Number:** 144" x 144" Ultra-Sorb LH,

**Product Construction Summary:**

Constructed of a light gauge steel header, sill and 2" dia. metal tubes with nozzles punched along their length. The tubes are oriented vertical to the ground and perpendicular to the duct air flow.

**Options/Subcomponent Summary:**

There are no other internal components.

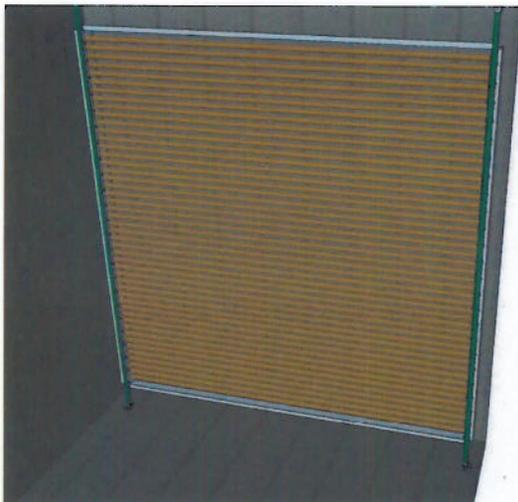
**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
150	NA	120.0	120.0	N/A	N/A	N/A

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Strut-rails placed vertically along each side of unit and secured with 3/8" dia. bolts spaced at 6" on center. Strut-rails secured to the AHU at roof and floor level using 3 sets of 1/4" dia. self tapping screws through 1/4" thick angle plate.

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UUT - 24

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2011-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Ultra-Sorb

**Model Number:** 144" x 144" Ultra-Sorb XV

**Product Construction Summary:**

Constructed of a light gauge stainless steel header, sill and 2" dia. metal tubes with nozzles punched along their length. The tubes are oriented vertical to the ground and perpendicular to the duct air flow.

**Options/Subcomponent Summary:**

Exterior insulated tubes

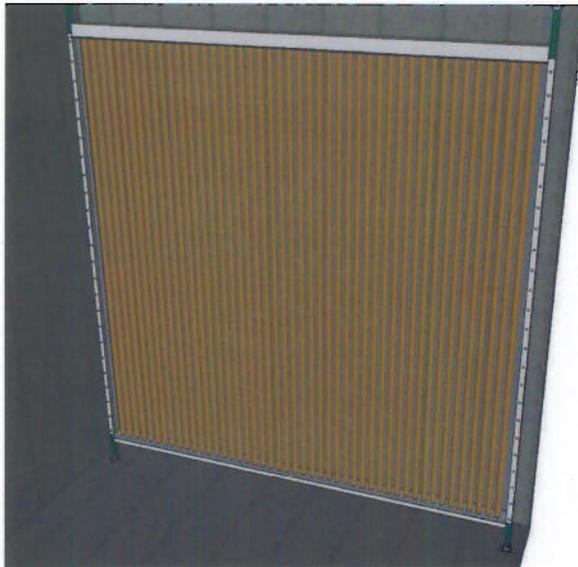
### UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
170	NA	120.0	120.0	N/A	N/A	N/A

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.0g	1.0	1.5	3.2g	2.4g	1.33g	0.53g

**Test Mounting Details:**



Strut-rails placed vertically along each side of unit and secured with 3/8" dia. bolts spaced at 6" on center. Strut-rails secured to the AHU at roof and floor level using 3 sets of 1/4" dia. self tapping screws through 1/4" thick angle plate.

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UUT - 25

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Ultra-Sorb

**Model Number:** Ultra-Sorb LV

**Product Construction Summary:**  
Constructed of a light gauge steel header, sill and 2" dia. metal tubes with nozzles punched along their length. The tubes are oriented vertical to the ground and perpendicular to the duct air flow.

**Options/Subcomponent Summary:**  
There are no other internal components.

### UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
23	NA	12.0	12.0	N/A	N/A	N/A

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Ultra-Sorb LV is attached to the duct along both vertical sides using an angle bracket with 1/2" dia. bolts: two (2) to the duct and three (3) to the Ultra-Sorb. The entire duct assembly is attached to ceiling fixture using Mason SCB/H Seismic Cable Bracing Assembly (attached).

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**UUT - 26**

**UNIT UNDER TEST (UUT)  
Summary Sheet**

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Ultra-Sorb

**Model Number:** Ultra-Sorb LH

**Product Construction Summary:**

Constructed of a light gauge steel header, sill and 2" dia. metal tubes with nozzles punched along their length. The tubes are oriented horizontal to the ground and perpendicular to the duct air flow.

**Options/Subcomponent Summary:**

Exterior insulated tubes

**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
25	NA	12.0	12.0	N/A	N/A	N/A

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Ultra-Sorb LH is attached to the duct along both top and bottom sides using an angle bracket with 1/2" dia. bolts: two (2) to the duct and three (3) to the Ultra-Sorb. The entire duct assembly is attached to ceiling fixture using Mason SCB/H Seismic Cable Bracing Assembly (attached).

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**UUT - 27**

**UNIT UNDER TEST (UUT)  
Summary Sheet**

TWEI Project No.: 2010-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Ultra-Sorb

**Model Number:** Ultra-Sorb XV

**Product Construction Summary:**

Constructed of a light gauge stainless steel header, sill and 2" dia. metal tubes with nozzles punched along their length. The tubes are oriented vertical to the ground and perpendicular to the duct air flow.

**Options/Subcomponent Summary:**

Exterior insulated tubes

**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
25	NA	12.0	12.0	N/A	N/A	N/A

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>ps</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Ultra-Sorb XV is attached to duct along each vertical side using an angle bracket with 1/2" dia. bolts: two (2) to the duct and three (3) to the Ultra-Sorb. All bolts use washers on both ends, and nylon locknuts. The entire duct assembly is attached to ceiling fixture using Mason SCB/H Seismic Cable Bracing Assembly (attached).

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**UUT - 28**

**UNIT UNDER TEST (UUT)  
Summary Sheet**

TWEI Project No.: 2011-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Ultra-Sorb

**Model Number:** 80" x 80" Ultra-Sorb LV

**Product Construction Summary:**

Constructed of light gauge sheet metal surrounds.

**Options/Subcomponent Summary:**

Vertical dispersion tubes, Insulated piping, deflector plate, multi-baffle plate, internal drying tube, steam valve, and thermal-resin tubelet.

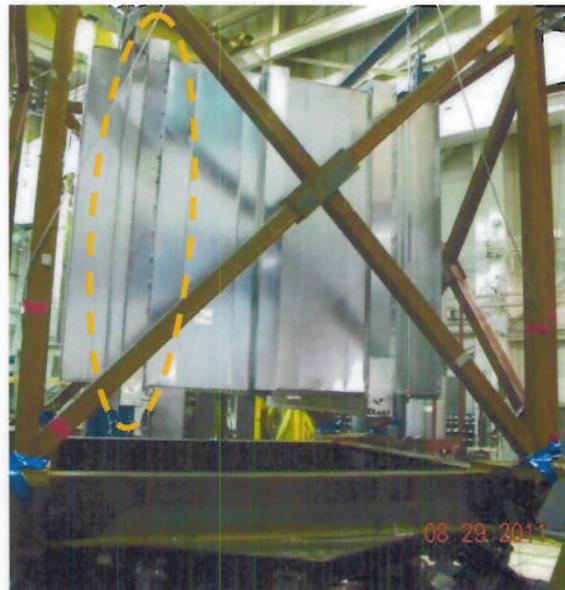
**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
150	NA	80.0	80.0	N/A	N/A	N/A

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Duct Mounted using 1/4" dia. thru bolts along top and bottom spaced at 6" O.C. and 1/4-20 self tapping screws along sides spaced at 6" O.C. The entire duct assembly is supported using 1/8" SS angle hangers secured with 1/4" thru bolts spaced at 6" and 3/8" dia. thread rod through both up to ceiling support fixture. Each corner is laterally supported with two (2) 3/8" dia. aircraft cables.

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UUT - 29

## UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2011-0138-CO-002

**Manufacturer:** Dri-Steem  
**Model Line:** Ultra-Sorb  
**Model Number:** 80" x 80" Ultra-Sorb LH

**Product Construction Summary:**  
 Constructed of light gauge sheet metal surrounds.

**Options/Subcomponent Summary:**  
 Horizontal dispersion tubes, insulated piping, deflector plate, multi-baffle plate, internal drying tube, steam valve, and thermal-resin tubelet.

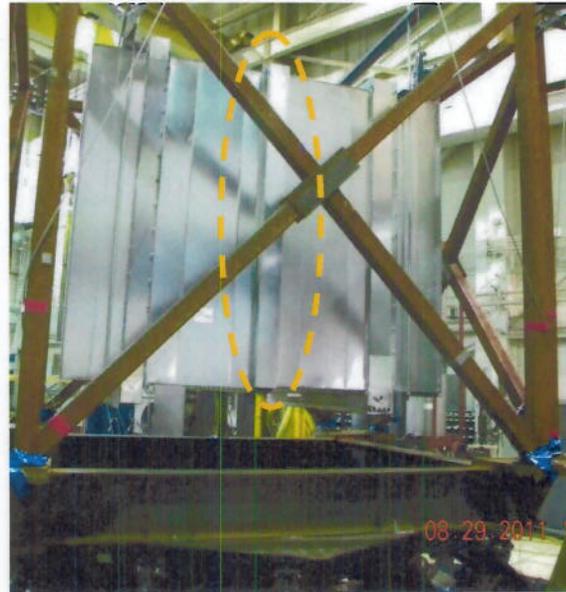
### UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
150	NA	80.0	80.0	N/A	N/A	N/A

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Duct Mounted using 1/4" dia. thru bolts along top and bottom spaced at 6" O.C. and 1/4-20 self tapping screws along sides spaced at 6" O.C. The entire duct assembly is supported using 1/8" SS angle hangers secured with 1/4" thru bolts spaced at 6" and 3/8" dia. thread rod through both up to ceiling support fixture. Each corner is laterally supported with two (2) 3/8" dia. aircraft cables.

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**UUT - 30**

**UNIT UNDER TEST (UUT)  
Summary Sheet**

TWEI Project No.: 2011-0138-CO-002

**Manufacturer:** Dri-Steem

**Model Line:** Ultra-Sorb

**Model Number:** 80" x 80" Ultra-Sorb XV

**Product Construction Summary:**

Constructed of light gauge sheet metal surrounds.

**Options/Subcomponent Summary:**

Vertical dispersion tubes, Insulated piping, deflector plate, multi-baffle plate, internal drying tube, steam valve, and thermal-resin tubelet.

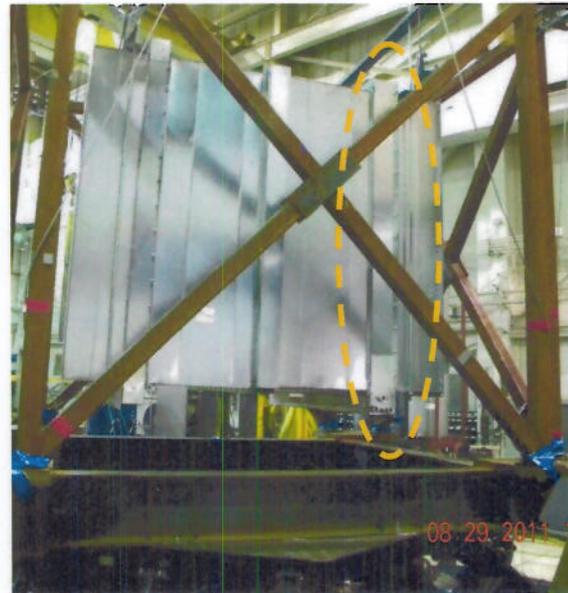
**UUT Properties**

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
150	NA	80.0	80.0	N/A	N/A	N/A

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2010	ICC-ES AC 156	2.5g	1.0	1.5	4.0g	3.0g	1.67g	0.67g

**Test Mounting Details:**



Duct Mounted using 1/4" dia. thru bolts along top and bottom spaced at 6" O.C. and 1/4-20 self tapping screws along sides spaced at 6" O.C. The entire duct assembly is supported using 1/8" SS angle hangers secured with 1/4" thru bolts spaced at 6" and 3/8" dia. thread rod through both up to ceiling support fixture. Each corner is laterally supported with two (2) 3/8" dia. aircraft cables.

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