



**DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION  
FACILITIES DEVELOPMENT DIVISION**

**APPLICATION FOR HCAI SPECIAL SEISMIC  
CERTIFICATION PREAPPROVAL (OSP)**

OFFICE USE ONLY

**APPLICATION #: OSP-0663**

**HCAI Special Seismic Certification Preapproval (OSP)**

Type:  New  Renewal

**Manufacturer Information**

Manufacturer: Industrial Electric Mfg.

Manufacturer's Technical Representative: Ashok Kulkarni

Mailing Address: 48205 Warm Springs Blvd., Fremont, CA 94539

Telephone: (510) 360-1247

Email: ashok.kulkarni@iemfg.com

**Product Information**

Product Name: Switchgear/Switchboards

Product Type: Switchgear - Medium Voltage

Product Model Number: Vesta-AR Switchgear rated 1200A to 2000A and CDP Panels rated 250A to 1200A. See attached "Product Range Summary"

General Description: Medium voltage switchgear rated 1200A to 2000A in NEMA Type 1 or 3R (non-walk-in) floor mounted enclosures. Wall mounted CDP panels (NEMA Type 1 or 3R) rated 250A to 1200A.

Mounting Description: Rigid, Floor/Wall Mounted

Tested Seismic Enhancements: Seismic enhancements made to the test units and/or modifications required to address anomalies during the tests shall be incorporated into the production units.

**Applicant Information**

Applicant Company Name: Forell Elsesser Structural Engineers

Contact Person: Aditi Palsapure

Mailing Address: 160 Pine Street, Floor 6, San Francisco, CA 94111

Telephone: (415) 248-3053

Email: a.palsapure@forell.com

Title: Structural Designer





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

Company Name: FORELL / ELSESSER ENGINEERS, INC.  
Name: Marco Scanu California License Number: S4454  
Mailing Address: 160 Pine Street, Suite 600, San Francisco, CA 94111  
Telephone: (415) 837-0700 Email: scanu@forell.com

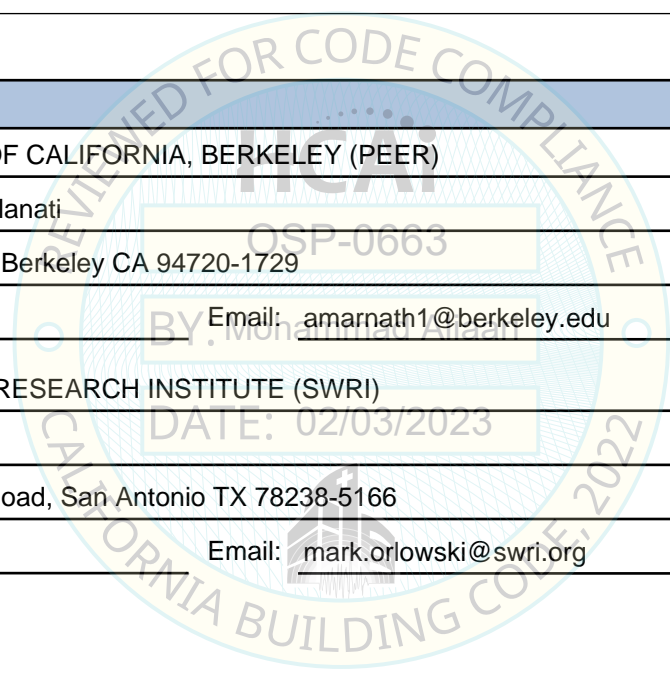
**Certification Method**

GR-63-Core       ICC-ES AC156       IEEE 344       IEEE 693       NEBS 3  
 Other (Please Specify): \_\_\_\_\_

**Testing Laboratory**

Company Name: UNIVERSITY OF CALIFORNIA, BERKELEY (PEER)  
Contact Person: Amarnath Kasalanati  
Mailing Address: 325 Davis Hall, Berkeley CA 94720-1729  
Telephone: (510) 642-6475 Email: amarnath1@berkeley.edu

Company Name: SOUTHWEST RESEARCH INSTITUTE (SWRI)  
Contact Person: Mark Orłowski  
Mailing Address: 6220 Culebra Road, San Antonio TX 78238-5166  
Telephone: (210) 684-5111 Email: mark.orłowski@swri.org





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**Seismic Parameters**

Design Basis of Equipment or Components ( $F_p/W_p$ ) = 1.31

SDS (Design spectral response acceleration at short period, g) = 1.75

$a_p$  (Amplification factor) = 2.5

$R_p$  (Response modification factor) = 6

$\Omega_0$  (System overstrength factor) = 2.0

$I_p$  (Importance factor) = 1.5

$z/h$  (Height ratio factor) = 1

Natural frequencies (Hz) = See attachment, UUT Summary Sheets

Overall dimensions and weight = See attachment, Certified Products Table

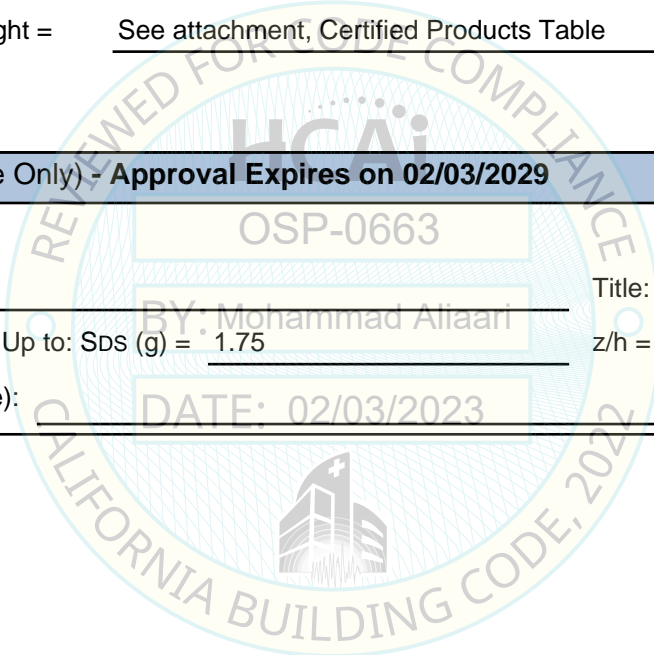
**HCAI Approval (For Office Use Only) - Approval Expires on 02/03/2029**

Date: 2/3/2023

Name: Mohammad Aliaari Title: Senior Structural Engineer

Special Seismic Certification Valid Up to: SDS (g) = 1.75 z/h = 1

Condition of Approval (if applicable): DATE: 02/03/2023



**IEM - Vesta-AR Switchgear and CDP Panels  
Product Range Summary**

**Vesta-AR Switchgear**

	Width	Depth	Height	Weight	Construction Material	Component No.	Testing Status	Model Number	SDS	Test Report Number	Fp/Wp
1200A Switchgear	24"	60"	96"	1,970 lbs	Walls 12 GA CRS, base 7 GA CRS, doors 11 or 12 GA CRS, NEMA 1	VESTA-AR-15 kv-1200A	UUT-1	IEM MV VESTA-AR Switchgear	2	Rpt. SWRI 18.18163.01.101.FR1	1.5
1200A Non-Walk-In Switchgear	26"	63"-76"	99"	2,050 lbs	Walls 12 GA CRS, base 7 GA CRS, doors 11 or 12 GA CRS, NEMA 3R	VESTA-AR-15 kv-1200A-NEMA3R	Interpolated	IEM MV VESTA-AR Switchgear	2	Interpolated	1.5
2000A Switchgear	30"	72"	96"	2,670 lbs	Walls 12 GA CRS, base 7 GA CRS, doors 11 or 12 GA CRS, NEMA 1	VESTA-AR-15 kv-2000A	UUT-2	IEM MV VESTA-AR Switchgear	1.75	Rpt. SWRI 18.18163.01.101.FR1	1.31
2000A Switchgear	32"	76"	99"	2,790 lbs	Walls 12 GA CRS, base 7 GA CRS, doors 11 or 12 GA CRS, NEMA 3R	VESTA-AR-15 kv-2000A-NEMA3R	Interpolated	IEM MV VESTA-AR Switchgear	1.75	Interpolated	1.31
2000A Switchgear	60"	72"	96"	3,250 lbs	Walls 12 GA CRS, base 7 GA CRS, doors 11 or 12 GA CRS, NEMA 1	VESTA-AR-15 kv-2000A	UUT5	IEM MV VESTA-AR Switchgear	2.00	Rpt. PEER/STI 2021-13	1.5
2000A Non-Walk-In Switchgear	62"	76"	99"	3,380 lbs	Walls 12 GA CRS, base 7 GA CRS, doors 11 or 12 GA CRS, NEMA 3R	VESTA-AR-15 kv-2000A-NEMA3R	Interpolated	IEM MV VESTA-AR Switchgear	2.00	Interpolated	1.5

- Notes: 1. Switchgear Units are rigid floor mounted  
2. CRS = ASTM-A-1011-00-CS TYPE B/SAE-1008 Cold Rolled Carbon Steel

BY: Mohammad Aliaari

**CDP Panels**

	Width	Depth	Height	Weight	Construction Material	Component No.	Testing Status	Model Number	SDS	Test Report Number	Fp/Wp
250A CDP Panel	38"	10.5"	54"	365 lbs	12 GA CRS, NEMA 1	CDP-W-250A	UUT-4	IEM CDP Panel	2.40	Rpt. No. 18.18163.01.FR1	1.8
250A CDP Panel (NEMA 3R)	40"	14"	55"	380 lbs	12 GA CRS, NEMA 3R	CDP-W-250A-NEMA 3R	Interpolated	IEM CDP Panel	2.40		1.8
400A CDP Panel	38"	10.5"	54"	365 lbs	12 GA CRS, NEMA 1	CDP-W-400A	Interpolated	IEM CDP Panel	2.40		1.8
400A CDP Panel (NEMA 3R)	40"	14"	55"	380 lbs	12 GA CRS, NEMA 3R	CDP-W-400A-NEMA 3R	Interpolated	IEM CDP Panel	2.40		1.8
600A CDP Panel	38"	10.5"	54"	365 lbs	12 GA CRS, NEMA 1	CDP-W-600A	Interpolated	IEM CDP Panel	2.40		1.8
600A CDP Panel (NEMA 3R)	40"	14"	55"	380 lbs	12 GA CRS, NEMA 3R	CDP-W-600A-NEMA 3R	Interpolated	IEM CDP Panel	2.40	Interpolated	1.8
800A CDP Panel	38"	14"	79"	680 lbs	12 GA CRS, NEMA 1	CDP-W-800A	Interpolated	IEM CDP Panel	2.40		1.8
800A CDP Panel (NEMA 3R)	40"	17.5"	80"	710 lbs	12 GA CRS, NEMA 3R	CDP-W-800A-NEMA 3R	Interpolated	IEM CDP Panel	2.40		1.8
1000A CDP Panel	38"	14"	79"	680 lbs	12 GA CRS, NEMA 1	CDP-W-1000A	Interpolated	IEM CDP Panel	2.40		1.8
1000A CDP Panel (NEMA 3R)	40"	17.5"	80"	710 lbs	12 GA CRS, NEMA 3R	CDP-W-1000A-NEMA 3R	Interpolated	IEM CDP Panel	2.40		1.8
1200A CDP Panel	38"	11.5"	70"	420 lbs	12 GA CRS, NEMA 1	CDP-W-1200A	UUT6	IEM CDP Panel	2.00	Rpt. No. PEER/STI 2021-11	1.5
1200A CDP Panel (NEMA 3R)	38"	14"	71"	450 lbs	12 GA CRS, NEMA 3R	CDP-W-1200A-NEMA 3R	Interpolated	IEM CDP Panel	2.00	Interpolated	1.5
1600A CDP Panel	38"	11.5"	90"	500 lbs	12 GA CRS, NEMA 1	CDP-W-1600A	UUT7	IEM CDP Panel	2.00	Rpt. No. PEER/STI 2021-11	1.5
1600A CDP Panel (NEMA 3R)	38"	14"	91"	540 lbs	12 GA CRS, NEMA 3R	CDP-W-1600A-NEMA 3R	Interpolated	IEM CDP Panel	2.00		1.5
1200A CDP Panel (NEMA 3R)	40"	17.5"	80"	710 lbs	12 GA CRS, NEMA 3R	CDP-W-1200A-NEMA 3R	Interpolated	IEM CDP Panel	2.00	Interpolated	1.5
1200A CDP Panel	38"	14"	79"	680 lbs	12 GA CRS, NEMA 1	CDP-W-1200A	UUT-3	IEM CDP Panel	2.40	Rpt. No. 18.18163.01.FR1	1.8

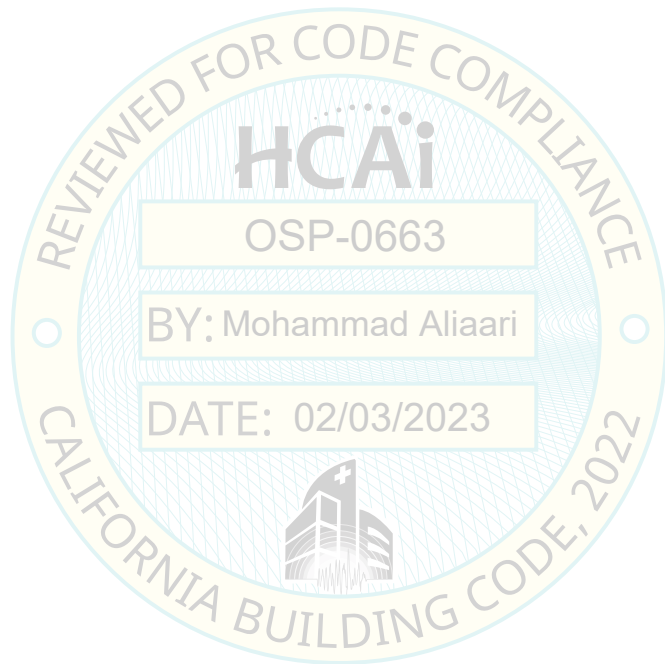
- Notes: 1. CDP Panels are rigid Wall Mounted  
2. CRS = ASTM-A-1011-00-CS TYPE B/SAE-1008 Cold Rolled Carbon Steel

**IEM - Vesta-AR Switchgear and CDP Panels  
Product Range Summary**

<b>Vesta-AR Switchgear Internal Sub Components (Rigid Floor mounted)</b>			
<b>Sub Component</b>	<b>Manufacturer</b>	<b>Part or Model No.</b>	<b>Testing Status</b>
1200A, 15kV Breaker	ABB	IEM-VM1-1200A	UUT-1
2000A, 15kV Breaker	ABB	IEM-VM1-2000A	UUT-2
1200A, 15kV Breaker	SIEMENS	IEM-SION-1200A	UUT5
2000A, 15kV Breaker	SIEMENS	IEM-SION-2000A	UUT5
Potential Transformer	IEM	IEM-VESTA-PT	UUT-1
Control Power Transformer	IEM	IEM-VESTA-CPT	UUT-2
Schweitzer Protective Relay	IEM	IEM-VESTA-SEL-RELAY	UUT-2
Current Meter	IEM	IEM-VESTA-AMMETER	UUT-1
Voltmeter	ABB	IEM-VESTA-VOLTMETER	UUT-1
Infra-red Window	ABB	IEM-VESTA-IR-WINDOW	UUT-2
Illuminated Push Button Relay	ABB	IEM-VESTA-IL-PB	UUT-2
LED Pilot Light Relay	ABB	IEM-VESTA-LED-PILOT	UUT-1

<b>CDP Panels Internal Sub Components (Rigid Wall mounted)</b>			
<b>Sub Component</b>	<b>Manufacturer</b>	<b>Part or Model No.</b>	<b>Testing Status</b>
150A Breaker	GE	SEL-150A	UUT-3, UUT-4
250A Breaker	GE	SFL-250A	UUT-4
600A Breaker	GE	SGL-600A	UUT-4
1200A Breaker	GE	SKL-1200A	UUT-3
150A Power Pact Breaker	Square D	HDP-150A	UUT-3, UUT-4
150A Power Pact Breaker	Square D	HGP-150A	UUT-3, UUT-4
150A Power Pact Breaker	Square D	HJP-150A	UUT-3, UUT-4
150A Power Pact Breaker	Square D	HLP-150A	UUT-3, UUT-4
125A Eaton PD Breaker	Eaton	PD-125A	Interpolated
250A Power Pact Breaker	Square D	JDP-250A	UUT-4
250A Power Pact Breaker	Square D	JGP-250A	UUT-4
250A Power Pact Breaker	Square D	JJP-250A	UUT-4
250A Power Pact Breaker	Square D	JLP-250A	UUT-4
225A Eaton PD Breaker	Eaton	PD-225A	UUT6
250A Eaton JG Breaker	Eaton	JG-250A	Interpolated
600A Power Pact Breaker	Square D	DGP-600A	UUT-4
600A Power Pact Breaker	Square D	DJP-600A	UUT-4
600A Power Pact Breaker	Square D	DLP-600A	UUT-4
600A Eaton PD Breaker	Eaton	PD-600A	UUT7
800A Power Pact Breaker	Square D	MGP-800A	UUT-3
800A Power Pact Breaker	Square D	MJP-800A	UUT-3

800A Eaton PD Breaker	Eaton	PD-800A	UUT7
1200A Power Pact Breaker	Square D	PGP-1200A	UUT-3
1200A Power Pact Breaker	Square D	PJP-1200A	UUT-3
1200A Power Pact Breaker	Square D	PKP-1200A	UUT-3
1200A Power Pact Breaker	Square D	PLP-1200A	UUT-3
1200A Eaton PD Breaker	Eaton	PD-1200A	UUT7



**Test Report 18.18163.01.101.FR1**

**UUT 1 (Smallest Vesta AR)**

Vesta-AR 1200A Switchgear

(Part # VESTA-AR-1200A)

Walls 12 GA CRS, base 7 GA CRS, doors 11 or 12 GA CRS, NEMA 1

24"W x 60"D x 96"H, 1970 lbs,

Rigid Floor mounted using (8) ½" dia bolts.



CRS = ASTM-A-1011-00-CS TYPE B/SAE-1008 Cold Rolled Carbon Steel

Door enhancements were performed to make the door very strong to withstand significant forces generated during an electrical arc (of the order of 15 psi) and seismic events. These are as follows –

- 2 additional door latches were added.
- The inner door frame was gasketed for better seal in the new design.
- In addition, an inner door sealing frame was added.

Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLEX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLEX-V</sub> (g)	A <sub>RIG-H</sub> (g)
CBC 2019	ICC-ES AC 156	2.00	1	3.20	2.40	1.34	0.54
<b>Natural Frequencies</b>			<b>Test Results</b>				
<b>F-B</b>	<b>S-S</b>	<b>V</b>	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during test.				
19.1	7.0	>33.3					

Subcomponent	Manufacturer	Part #
1200A, 15kV Breaker	ABB	IEM-VM1-1200A
Potential Transformer	IEM	IEM-VESTA-PT
Current Meter	IEM	IEM-VESTA-AMMETER
Voltmeter	ABB	IEM-VESTA-VOLTMETER
LED Pilot Light Relay	ABB	IEM-VESTA-LED-PILOT

**Test Report 18.18163.01.101.FR1  
UUT 2**

Vesta-AR 2000A Switchgear  
(Part # VESTA-AR-2000A)

Walls 12 GA CRS, base 7 GA CRS, doors 11 or 12  
GA CRS NEMA 1

30"W x 72"D x 96"H, 2670 lbs

Rigid Floor mounted using (8) ½" dia bolts.

CRS = ASTM-A-1011-00-CS TYPE B/SAE-1008 Cold  
Rolled Carbon Steel



Door enhancements were performed to make the door very strong to withstand significant forces generated during an electrical arc (of the order of 15 psi) and seismic events. These are as follows –

- 2 additional door latches were added.
- The inner door frame was gasketed for better seal in the new design.
- In addition, an inner door sealing frame was added.

Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-H</sub> (g)
CBC 2019	ICC-ES AC 156	1.75	1	2.80	2.10	1.17	0.47
Natural Frequencies			Test Results				
F-B	S-S	V	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during test.				
15.8	6.1	20.1					

Subcomponent	Manufacturer	Part #
2000A, 15kV Breaker	ABB	IEM-VM1-2000A
Control Power Transformer	IEM	IEM-VESTA-CPT
Schweitzer Protective Relay	IEM	IEM-VESTA-SEL-RELAY
Infra-red Window	ABB	IEM-VESTA-IR-WINDOW
Illuminated Push Button Relay	ABB	IEM-VESTA-IL-PB



**Test Report 18.18163.01.101.FR1**

**UUT 3 (Largest CDP Panel)**

1200A CDP Panel

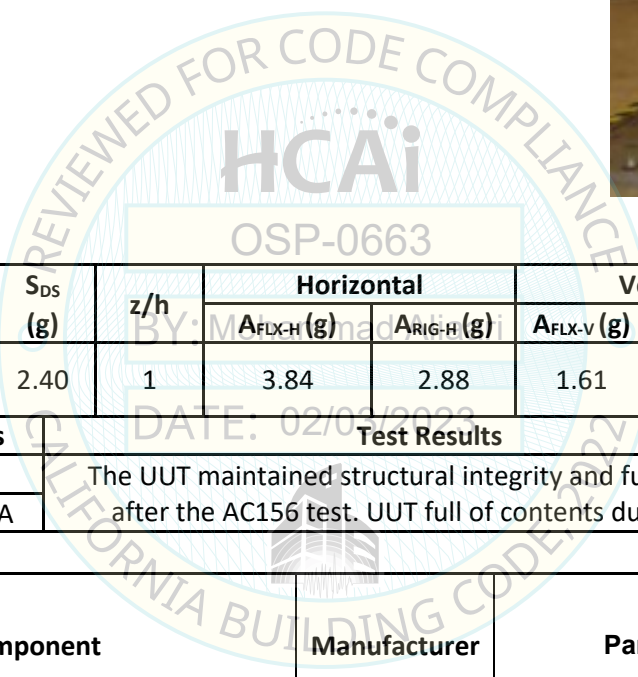
(Part # CDP-W-1200A)

12 GA CRS, NEMA 1

38"W x 14"D x 79"H, 680 lbs

Rigid Wall mounted using (4) ½" dia bolts.

CRS = ASTM-A-1011-00-CS TYPE B/SAE-1008 Cold Rolled Carbon Steel



Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-H</sub> (g)
CBC 2019	ICC-ES AC 156	2.40	1	3.84	2.88	1.61	0.64
<b>Natural Frequencies</b>			<b>Test Results</b>				
<b>F-B</b>	<b>S-S</b>	<b>V</b>	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during test.				
N/A	N/A	N/A					

Subcomponent	Manufacturer	Part #
150A Breaker	GE	SEL-150A
1200A Breaker	GE	SKL-1200A
150A Power Pact Breaker	Square D	HDP-150A
150A Power Pact Breaker	Square D	HGP-150A
150A Power Pact Breaker	Square D	HJP-150A
150A Power Pact Breaker	Square D	HLP-150A
800A Power Pact Breaker	Square D	MGP-800A
800A Power Pact Breaker	Square D	MJP-800A
1200A Power Pact Breaker	Square D	PGP-1200A
1200A Power Pact Breaker	Square D	PJP-1200A
1200A Power Pact Breaker	Square D	PKP-1200A
1200A Power Pact Breaker	Square D	PLP-1200A

**Test Report 18.18163.01.101.FR1**

**UUT 4 (Smallest CDP Panel)**

250A CDP Panel

(Part # CDP-W-250A)

12 GA CRS, NEMA 1

38"W x 10.5"D x 54"H, 365 lbs

Rigid Wall mounted using (4) ½" dia bolts.

CRS = ASTM-A-1011-00-CS TYPE B/SAE-1008 Cold Rolled Carbon Steel



Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-H</sub> (g)
CBC 2019	ICC-ES AC 156	2.40	1	3.84	2.88	1.61	0.64
<b>Natural Frequencies</b>			<b>Test Results</b>				
<b>F-B</b>	<b>S-S</b>	<b>V</b>	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during test.				
N/A	N/A	N/A					

Subcomponent	Manufacturer	Part #
150A Breaker	GE	SEL-150A
250A Breaker	GE	SFL-250A
600A Breaker	GE	SGL-600A
150A Power Pact Breaker	Square D	HDP-150A
150A Power Pact Breaker	Square D	HGP-150A
150A Power Pact Breaker	Square D	HJP-150A
150A Power Pact Breaker	Square D	HLP-150A
250A Power Pact Breaker	Square D	JDP-250A
250A Power Pact Breaker	Square D	JGP-250A
250A Power Pact Breaker	Square D	JJP-250A
250A Power Pact Breaker	Square D	JLP-250A
600A Power Pact Breaker	Square D	DGP-600A
600A Power Pact Breaker	Square D	DJP-600A
600A Power Pact Breaker	Square D	DLP-600A

**Test-Report-PEER STI 2021-13 (NC1328) IEM MV Vesta AC156**

**UUT 5**

2000A Switchgear

(Model # 95991)

Walls 12 GA CRS, base 7 GA CRS, doors 11 or 12 GA CRS, NEMA 1  
60"W x 72"D x 96"H, 3,250 lbs

Rigid Floor mounted using (8) 5/8" A325 bolts

CRS = ASTM-A-1011-00-CS TYPE B/SAE-1008 Cold Rolled Carbon  
Steel



Figure 3. Test setup for UUT

Building Code	Test Criteria	S <sub>Ds</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-V</sub> (g)
CBC 2019	ICC-ES AC 156	2.00	1	3.20	2.40	1.34	0.54
<b>Natural Frequencies</b>			<b>Test Results</b>				
<b>F-B</b>	<b>S-S</b>	<b>V</b>	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during test.				
15	8.1	19.0					

Subcomponent	Manufacturer	Part #
1200A, 15kV Breaker	SIEMENS	IEM-SION-1200A
2000A, 15kV Breaker	SIEMENS	IEM-SION-2000A

**Test Report PEER STI 2021-11 (NCPEER-1326) IEM panel AC156**

**UUT 6**

1200A CDP Panel

(Model # 112334-11)

12 GA CRS, NEMA 1

38"W x 11.5"D x 70"H, 420 lbs (UUT4 in Figure 9)

Rigid Wall mounted using (4) 1/2" A325 bolts

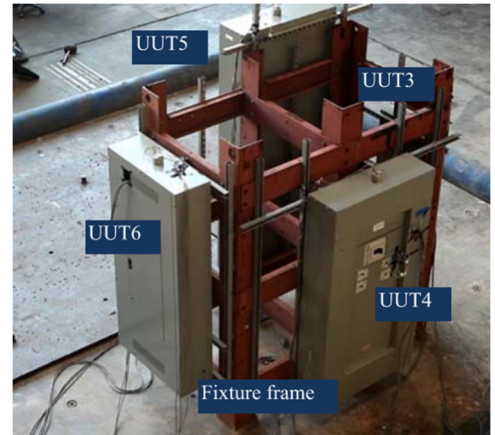


Figure 9. Attachment for UUTs

Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-H</sub> (g)
CBC 2019	ICC-ES AC 156	2.00	1	3.20	2.40	1.34	0.54
<b>Natural Frequencies</b>			<b>Test Results</b>				
<b>F-B</b>	<b>S-S</b>	<b>V</b>	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during test.				
10.6	8.6	11.8					

Subcomponent	Manufacturer	Part #
225A Eaton PD Breaker	Eaton	PD-225A

**Test Report PEER STI 2021-11 (NCPEER-1326) IEM panel AC156  
 UUT 7**

1600A CDP Panel  
 (Model # 112344-14)  
 12 GA CRS, NEMA 1  
 38"W x 11.5"D x 90"H, 500 lbs (UUT5 in Figure 9)  
 Rigid Wall mounted using (4) 1/2" A325 bolts

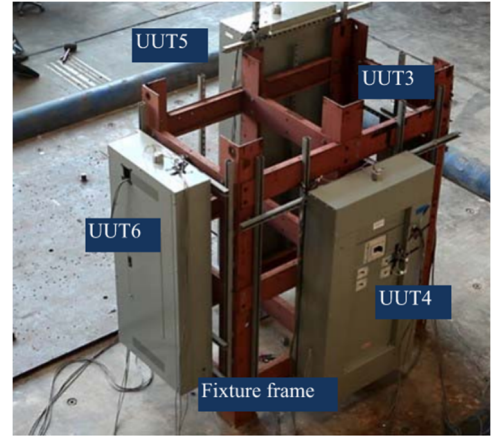


Figure 9. Attachment for UUTs

Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-H</sub> (g)
CBC 2019	ICC-ES AC 156	2.00	1	3.20	2.40	1.34	0.54
Natural Frequencies			Test Results				
F-B	S-S	V	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during test.				
10.3	8.7	18					

Subcomponent	Manufacturer	Part #
600A Eaton PD Breaker	Eaton	PD-600A
800A Eaton PD Breaker	Eaton	PD-800A
1200A Eaton PD Breaker	Eaton	PD-1200A