APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP-0054

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Electronic Systems Support

Manufacturer's Technical Representative: Ruben Narvaez

Mailing Address: 3233 W Kingsley Rd. Suite 200, Garland, TX 75041

Telephone: (972) 272-2468 Email: ruben.narvaez@ess.to

Product Information

Product Name: Battery Cabinets

Product Type: Electrical Equipment

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

General Description: Light gage steel cabinets with rigid frame elements along all edges. The units are welded and screwed together to form the cabinets. The cabinets contain batteries and breakers. Seismic enhancements made to the test units required to address the anomalies observed during the tests shall be incorporated into the production units.

Mounting Description: Cabinets are rigid base mounted.

Applicant Information

Applicant Company Name: DCL Labs, LLC.

Contact Person: Kelly Laplace

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

Telephone: 775-358-5085 Email: kelly@shaketest.com

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2016.

Signature of Applicant: K. Laplace Date: 6/1/21

Title: Business Manager Company Name: DCL Labs, LLC.

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

Company Name: VMC Group

Name: Kenneth Tarlow California License Number: SE-2851

Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

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

Supports and Attachments Preapproval

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

☒ Supports and attachments are not preapproved

Certification Method

☒ Testing in accordance with: ☒ ICC-ES AC156

☐ Other (Please Specify):

Testing Laboratory #1

Company Name: ETL Dallas

Contact Name: Brady Richard

Mailing Address: 11034 Indian Trail, Dallas, TX 75229-3513

Telephone: (972) 247-9657 Email: info@etldallas.com

Testing Laboratory #2

Company Name: Dynamic Certification Laboratories, LLC.

Contact Name: Josh Sailer, Laboratory Manager

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

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

Seismic Parameters

Design in accordance with ASCE 7-16 Chapter 13: ☒ Yes ☐ No

Design Basis of Equipment or Components (F_p/W_p) = 1.125

S_{DS} (Design spectral response acceleration at short period, g) = 1.50

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 attachment

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

Equipment or Components @ grade designed in accordance with ASCE 7-16 Chapter 15: ☐ Yes ☒ No

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

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

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

R (Response modification coefficient) =

Ω_0 (System overstrength factor) =

C_d (Deflection amplification factor) =

I_p (Importance factor) = 1.5

Height to Center of Gravity above base =

Equipment or Component Natural Frequencies (Hz) =

Overall dimensions and weight (or range thereof) =

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

List of Attachments Supporting Special Seismic Certification

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

☐ Other(s) (Please Specify):

OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2025

Signature: Date: August 6, 2021

Print Name: Timothy J. Piland Title: SSE

Special Seismic Certification Valid Up to: S_{DS} (g) = 1.50 z/h = 1

Condition of Approval (if applicable):

Table 1- Special Seismic Certification
Certified Components - 16V Battery Cabinets

DCL Project Number: 45798-1901

Manufacturer: Electronic Systems Support
Product Line: Battery Cabinets
Certified Construction: Powder-coated carbon steel frame
Certified Options: Enclosures, batteries and breakers
Certified Mounting Description: Rigid base mounted
Seismic Level: Sds = 1.5g, z/h = 1.0

Model Number	Horizontally-arrayed batteries[1]	Vertically stacked batteries	Unit Battery Size	Battery Size Tested	Construction Material	NEMA Rating	Unit Dimensions (in)			Max. Weight (lb.)	Unit
							Width[1]	Depth	Height		
Sx33800144BLxxxx	3	3	800	n/a	Powder-coated carbon steel	1	25	31.5	72	2,420	Extrapolated[3]
ST35xxx144BL250D	3	3	925	800, 925	Powder-coated carbon steel	1	25	31.5	84[2]	2,600	UUT4[5]
Sx34800192BLxxxx	3	4	800	n/a	Powder-coated carbon steel	1	25	31.5	72	3,290	Interpolated
Sx34925192BLxxxx	3	4	925	n/a	Powder-coated carbon steel	1	25	31.5	72	3,350	Interpolated
Sx35800240BLxxxx	3	5	800	n/a	Powder-coated carbon steel	1	25	31.5	84	4,030	Interpolated
ST35925240BLA00A	3	5	925	925	Powder-coated carbon steel	1	25	31.5	84[2]	4,092	UUT2
Sx64550384BLxxxx	6	4	550	n/a	Powder-coated carbon steel	1	32	31.5	72	4,400	Interpolated
ST65550288BL250C	6	3	550	550	Powder-coated carbon steel	1	32	31.5	84[2]	3,300	UUT3
ST65550480BLA00B	6	5	550	550	Powder-coated carbon steel	1	32	31.5	84[2]	5,185	UUT1
Sx63800288BLxxxx	6 (3,3)	3	800	n/a	Powder-coated carbon steel	1	50	31.5	72	4,820	Extrapolated[4]
Sx63925288BLxxxx	6 (3,3)	3	925	n/a	Powder-coated carbon steel	1	50	31.5	72	5,180	Extrapolated[4]
Sx64800384BLxxxx	6 (3,3)	4	800	n/a	Powder-coated carbon steel	1	50	31.5	72	6,200	Extrapolated[4]
Sx64925384BLxxxx	6 (3,3)	4	925	n/a	Powder-coated carbon steel	1	50	31.5	72	6,680	Extrapolated[4]
Sx65800480BLxxxx	6 (3,3)	5	800	n/a	Powder-coated carbon steel	1	50	31.5	84	7,580	Extrapolated[4]
Sx65925480BLxxxx	6 (3,3)	5	925	n/a	Powder-coated carbon steel	1	50	31.5	84	8,180	Extrapolated[4]

Notes:

1. For systems containing 800 or 925 batteries, a 6-battery horizontal array is two structurally-independent cabinets installed side-by-side, each containing a 3-battery horizontal array.
2. Tested unit used a full height enclosure (84"). However, a 3- and 4- vertically stacked unit uses a 72" tall enclosure
3. Unit is extrapolated based on UUT4 Test. The units are similar in construction to UUT4.
4. Unit is extrapolated based on UUT2 and UUT4 test (extrapolated unit is two structurally-independent 25-inch wide enclosures installed side-by-side, as tested in UUT2 and UUT4).
5. Multiple batteries were used in the UUTs to cover the battery types offered in the full product line. A distinct model number cannot be associated with the actual tested units since they utilize multiple battery types.

Options (designated as "x" in certified model numbers):

Digit 2: Cabinet color (T, A, C, E)

Digit 13-15: Breaker size in Amps (250 - A00 for 250Amp - 1000Amp breakers); reference certified breakers subcomponent table

Digit 16: Breaker option (A, B, C, D, E, F, G, H, K); reference breaker option subcomponent table

Table 2
16V Battery Cabinet Nomenclature Chart

16V Cabinet w/Breaker System Part Numbers

S T 6 5 925 480 B 0 600 A

	Cabinet	Number of Blocs Wide	Number of Blocs High	Type of Cell	System Voltage	Breaker	Options	Breaker Size (in Amps)	Breaker Options: UVR or Shunt Trip
System	Type								
Digit 1	Digit 2	Digit 3	Digit 4	Digits 5-7	Digits 8-10	Digit 11	Digit 12	Digit 13-15	Digit 16
One Character in Length	One Character in Length	One Character in Length	One Character in Length	Three Characters in Length	Three Characters in Length	One Character in Length	One Character in Length	Three Characters in Length	One Character in Length
S System	T Top Breaker, Gray	3*	3	550 16HX550F	144 144 Volts	B Breaker	L Locked	250 250 Amps	A 24 VDC Shunt Trip/Aux. Contact
		6	4	800 16HX800F	192 192 Volts			300 300 Amps	B 48 VDC Shunt Trip/Aux. Contact
	A Top Breaker , Black		5	925 16HX925F	240 240 Volts			400 400 Amps	C 24 UVR/Aux. Contact
					288 288 Volts			600 600 Amps	D 48 UVR/Aux. Contact
	C Top Option , White				384 384 Volts			800 800 Amps	E 250 VDC Shunt Trip/Aux. Contact
					480 480 Volts			A00 1000 Amps	F Aux. Contact (only)
	E Top Breaker, Liebert Black								G 250 UVR/Aux. Contact
									H 120 VDC Shunt Trip/Aux. Contact
									K 120 UVR/Aux. Contact

*Only available for 800/925 with a system voltage up to 240

Table 3- Special Seismic Certification
Certified Components - 12V Battery Cabinets

DCL Project Number: 45798-1901

Manufacturer: Electronic Systems Support
Product Line: Battery Cabinets
Certified Product Construction: Powder-coated carbon steel frame
Certified Options: Enclosures, batteries and breakers
Certified Mounting Description: Rigid base mounted
Seismic Level: Sds = 1.5g, z/h = 1.0

Model Number[1]	Construction Material	NEMA Rating	Battery Qty.	Battery Mfr.	Breaker	Amps	Dimensions (in)			Weight	Unit
							Width	Depth	Height		
ETC40AE04xxxxxB16F	Powder-Coated Carbon Steel	1	4	Enersys, C&D, East Penn, CSB, GNB, Fiamm	Square D	100	40.0	29.5	78.7	820	UUT6
ETC40xx04xxxxxxxx	Powder-Coated Carbon Steel	1	4	Enersys, C&D, East Penn, CSB, GNB, Fiamm	Square D	100-600	40.0	29.5	76.8 - 78.7	820 - 4,710	Interpolated
ETC40xx05xxxxxxxx		1	5								Interpolated
ETC40xx06xxxxxxxx		1	6								Interpolated
ETC40xx08xxxxxxxx		1	8								Interpolated
ETC40xx10xxxxxxxx		1	10								Interpolated
ETC40xx12xxxxxxxx		1	12								Interpolated
ETC40xx15xxxxxxxx		1	15								Interpolated
ETC40xx18xxxxxxxx		1	18								Interpolated
ETC40xx20xxxxxxxx		1	20								Interpolated
ETC40xx24xxxxxxxx		1	24								Interpolated
ETC40xx27xxxxxxxx		1	27								Interpolated
ETC40xx29xxxxxxxx		1	29								Interpolated
ETC40xx30xxxxxxxx		1	30								Interpolated
ETC40xx32xxxxxxxx		1	32								Interpolated
ETC40xx40xxxxxxxx		1	40								Interpolated
ETC40AE40xxxxxH04E	Powder-Coated Carbon Steel	1	40	Enersys, C&D, East Penn, CSB, GNB, Fiamm	Square D	600	40.0	29.5	78.7	4,710	UUT5

1. Multiple batteries were used in the UUTs to cover all the battery types offered in the full product line. A distinct model number cannot be associated with the actual tested units since they utilize multiple battery types.

Options (designated as "x" in certified model numbers):
Digit 6: Cabinet color (A, B, C, D, E, F, G, H, I)
Digit 7: Cabinet height, 76.8" to 78.7" (C, D, E, F, G, H, J)
Digit 10-14: Battery model per manufacturer; reference certified batteries subcomponent table
Digit 15: B or H, for breaker or breaker with handle; reference certified breakers subcomponent table
Digit 16-17: 02 to 16 for 100 to 600 Amp breaker; reference certified breakers subcomponent table
Digit 18: Breaker option (A, B, C, D, E, F, G, H, J, K); reference breaker option subcomponent table for explanation of designation in certified component nomenclature

Table 4
12V Battery Cabinet Nomenclature Chart

ESS ETC40 TOP TERMINAL CABINET SYSTEM MATRIX

ESS CABINET WITH BREAKER SYSTEM PART NUMBERS

E T C 40 A E 40 HX540 B 04 A

DIGIT 1	DIGIT 2	DIGIT 3	DIGIT 4-5	DIGIT 6	DIGIT 7	DIGIT 8-9	DIGIT 10-14		DIGIT 15	DIGIT 16-17	DIGIT 18
	TYPE OF BATTERY	TYPE OF CABINET OR RACK	CABINET MODEL	COLOR	HEIGHT (INCHES)	BATTERY QUANTITY	BATTERY MODEL PER MANUFACTURER		BREAKER (W/BRAND)	AMPS	BREAKER OPTION
E = ESS	T = TOP TERMINAL	C = CABINET	40	***A = BLACK**	C = 80.0	40	**ENERSYS**	**CSB**	B =BREAKER	04 = 600 AMPS	A = 24 VDC SHUNT TRIP/AUX. CONTACT
				B = BEIGE	D = 79.0	32	HX205 = 12HX205	HL200 = HRL12200W	H= BREAKER W/HANDLE OPTION	05 = 500 AMPS	B = 48 VDC SHUNT TRIP/AUX. CONTACT
				C = LIEBERT GRAY	****E = 78.7**	30	HX300 = 12HX300	HL280 = HRL12280W		06 = 450 AMPS	C = 24 UVR/AUX. CONTACT
				D = MITSUBISHI BEIGE	F = 78.4	29	HX330 = 12HX330	HL330 = HRL12330W		07 = 400 AMPS	D = 48 UVR/AUX. CONTACT
				E = MGE WHITE	G = 78.0	27	HX400 = 12HX400	HL390 = HRL12390W		08 = 350 AMPS	E = 120 VDC SHUNT TRIP/AUX. CONTACT
				F = TOSHIBA BLACK	H = 77.3	24	HX505 = 12HX505	HL500 = HRL12500W		09 = 300 AMPS	F = 250 VDC SHUNT TRIP/AUX. CONTACT
				G = GE WHITE	J = 76.8	20	HX540 = 12HX540	HL540 = HR12540W		10 = 250 AMPS	G = 120 UVR/AUX. CONTACT
				H = LIEBERT BLACK		18	XE760 = 12XE760-FR	XL360 = XHR12360W		11 = 225 AMPS	H = 250 UVR/AUX. CONTACT
				I = EATON BLACK		15	XE040 - 12XE1040-FR	XL410 = XHRL12410W		12 = 200 AMPS	J = 24 VDC UVR WITH BELL ALARM/AUX. CONTACT
						12	**C & D**	XL475 = XHRL12475W		13 = 175 AMPS	K = AUX. CONTACT (ONLY)
						10	210MR = UPS12-210MR	XL620 = XHRL12620W		14 = 150 AMPS	
						8	300MR = UPS12-300MR	**FIAMM**		15 = 125 AMPS	
						6	350MR = UPS12-350MR	FL200 = 12FLX200		16 = 100 AMPS	
						5	400MR = UPS12-400MR	FL250 = 12FLX250			
						4	490MR = UPS12-490MRLP	FL300 = 12FLX300			
							490MR = UPS12-490MR	FL350 = 12FLX350			
							540MR = UPS12-540MR	FL400 = 12FLX400			
							600MR = UPS12-600MR	FL500= 12FLX500			
							EAST PENN	FL540 = 12FLX540			
							HR200 = 45HR2000				
							HR300 = 24HR3000				
							HR350 = 27HR3500				
							HR400 = 31HR4000				
							HR500 = 31HR5000				
							HR550 = 31HR5500				

*Represents standard color for all ESS Cabinets (Digit 6)

**Represents ESS standard height of Top Terminal Battery Cabinets (Digit 7)

Table 5- Special Seismic Certification
Certified Subcomponents for 12V and 16V Battery Cabinets- Enclosures

DCL Project Number: 45798-1901

Manufacturer: Electronic Systems Support
Product Line: Battery Cabinets
Seismic Level: Sds = 1.5g, z/h = 1.0

Enclosures

Cabinet Type	Manufacturer	Construction	Material	Dimensions (in)			NEMA Rating	Weight (lb.)	Unit
				Width	Depth	Height			
16V Battery Cabinets	ESS	Welded	Powder-coated carbon steel	25	31.5	72	1	360	Extrapolated[1]
	ESS	Welded	Powder-coated carbon steel	25	31.5	84	1	422	UUT2, UUT4
	ESS	Welded	Powder-coated carbon steel	32	31.5	72	1	490	Interpolated
	ESS	Welded	Powder-coated carbon steel	32	31.5	84	1	550	UUT1, UUT3
	ESS	Welded	Powder-coated carbon steel	50	31.5	72	1	640	Extrapolated[2]
	ESS	Welded	Powder-coated carbon steel	50	31.5	84	1	750	Extrapolated[3]
12V Battery Cabinets	ESS	Welded	Powder-coated carbon steel	40	29.5	76.8 - 78.4	1	538 - 543	Extrapolated[4]
	ESS	Welded	Powder-coated carbon steel	40	29.5	78.7	1	545	UUT5, UUT6

Notes:

1. Extrapolated cabinet is based on the testing of UUT2 and UUT4. These cabinets are the same footprint as UUT2 and UUT4, but 12 inches shorter and house one horizontal tier less (up to four horizontal tiers instead of five).

2. Extrapolated cabinet is two structurally-independent 25"-wide cabinets, installed side-by-side. Cabinets were tested in UUT2 and UUT4. These cabinets are the same footprint as the tested units, but 12 inches shorter and house one horizontal tier less (up to four horizontal tiers instead of five).

3. Extrapolated cabinet is two structurally-independent 25"-wide cabinets, installed side-by-side. Cabinets were tested in UUT2 and UUT4.

4. Extrapolated cabinet is based on the UUT5 and UUT6 testing. The varying height is to match certain UPS manufacturers height. No additional batteries are added and the batteries stay in the same location.

Table 6- Special Seismic Certification
Certified Subcomponents for 16V Battery Cabinets- Batteries

DCL Project Number: 45798-1901

Manufacturer: Electronic Systems Support
Product Line: Battery Cabinets
Seismic Level: Sds = 1.5g, z/h = 1.0

Batteries: 16V Battery Cabinets

Model No.	Designation in Certified Component Nomenclature (Digits 5-7)	Manufacturer	Case Material	Type	Voltage	Approx. Dimensions (in)			Approx. Weight (lb.)	Unit
						Width	Depth	Height		
16HX550F-FR	550	Enersys	Thick-wall plastic	Lead-Acid	16	4.6	27.2	12.3	151	UUT1, UUT3
16HX800F-FR	800					7.0	27.2	12.3	232	UUT4
16HX925F-FR	925					7.0	27.2	12.3	248	UUT2, UUT4

Table 7- Special Seismic Certification
Certified Subcomponents for 12V Battery Cabinets- Batteries

DCL Project Number: 45798-1901

Manufacturer: Electronic Systems Support
Product Line: Battery Cabinets
Seismic Level: Sds = 1.5g, z/h = 1.0

Batteries: 12V Battery Cabinets

Model No.	Designation in Certified Component Nomenclature (Digits 10-14)	Manufacturer	Case Material	Type	Voltage	Approx. Dimensions (in)			Approx. Weight (lb.)	Unit
						Width	Depth	Height		
12HX205	HX205	Enersys	Thick-wall plastic	Lead-Acid	12	5.5	8.9	8.1	43	UUT6
12HX300	HX300					6.9	10.2	8.2	60	Interpolated
12HX330	HX330					6.8	11.8	8.4	71	Interpolated
12HX400	HX400					6.8	13.3	8.3	80	Interpolated
6HX800	HX800					6.8	13.4	8.3	80	Interpolated
12HX505	XH505					6.8	13.3	10.7	103	Interpolated
12HX540	XH540					6.8	13.3	10.7	106	UUT5
12XE760	XE760					6.8	13.0	8.6	77	Extrapolated*
12XE1040	XE040					6.8	13.3	10.8	97	Extrapolated*
UPS12-210MR	210MR	C & D	Polypropylene	Lead-Acid	12	5.5	9.0	8.1	40	UUT6
UPS12-300MR	300MR					6.8	10.3	8.0	58	Interpolated
UPS12-350MR	350MR					6.8	12.0	8.1	67	Interpolated
UPS6-620MR	620MR					7.0	12.6	8.9	72	Interpolated
UPS12-400MR	400MR					6.8	13.4	8.5	76	Interpolated
UPS12-490MRLP	490ML					6.8	13.4	8.5	83	Interpolated
UPS12-490MR	490MR					6.8	13.6	10.9	100	Interpolated
UPS12-540MR	540MR					6.8	13.6	10.9	100	UUT5
45HR2000	HR200	East Penn	Polypropylene	Lead-Acid	12	5.5	9.0	8.3	40	UUT6
24HR3000	HR300					6.6	10.2	8.2	56	Interpolated
27HR3500	HR350					6.6	12.0	8.2	66	Interpolated
31HR4000	HR400					6.7	12.9	8.7	74	Interpolated
31HR5000	HR500					6.8	13.5	11.2	98	Interpolated
31HR5500	HR550					6.8	13.5	11.2	98	UUT5

*Extrapolated batteries are bookended by the batteries tested in UUT5 and UUT6.

Table 8- Special Seismic Certification
Certified Subcomponents for 12V Battery Cabinets- Batteries (Continued)

DCL Project Number: 45798-1901

Manufacturer: Electronic Systems Support
Product Line: Battery Cabinets
Seismic Level: Sds = 1.5g, z/h = 1.0

Batteries: 12V Battery Cabinets

Model No.	Designation in Certified Component Nomenclature	Manufacturer	Material	Type	Voltage	Approx. Dimensions (in)			Approx. Weight (lb.)	Unit
						Width	Depth	Height		
HRL12200W	HL200	CSB	PPE	Lead-Acid	12	5.5	9.0	8.2	38	UUT6
HRL12280W	HL280					6.6	10.3	8.4	57	Interpolated
HRL12330W	HL330					6.7	12.2	8.4	65	Interpolated
HRL12390W	HL390					6.7	13.5	8.6	73	Interpolated
HRL12540W	HL540					6.7	13.5	10.8	97	UUT5
XHRL12360W	XL360					6.6	10.3	8.4	62	Interpolated
XHRL12410W	XL410					6.7	12.2	8.4	72	Interpolated
XHRL12475W	XL475					6.7	13.5	8.5	80	Interpolated
S12V120	SV120	GNB	Reinforced polypropylene container and cover	Lead-Acid	12	6.5	6.8	5.9	27	Extrapolated*
S12V170	SV170					6.6	7.8	7.0	36	Extrapolated*
S12V285	SV285					6.9	10.3	8.8	61	UUT6
S12V300	SV300					6.9	10.3	8.8	63	Interpolated
S12V370	SV370					6.9	12.1	8.8	74	Interpolated
S12V500	SV500					6.8	13.6	10.9	106	Interpolated
S12V550	SV550					6.8	13.6	10.9	106	UUT5
12FLX200	FL200	Fiamm	Thick-wall ABS case	Lead-Acid	12	5.4	9.0	8.4	41	UUT6
12FLX250	FL250					6.5	10.7	7.7	52	Interpolated
12FLX300	FL300					6.9	10.3	8.6	60	Interpolated
12FLX350	FL350					6.9	11.9	8.6	68	Interpolated
12FLX400	FL400					6.9	13.3	8.5	76	Interpolated
12FLX500	FL500					6.9	13.3	10.9	102	Interpolated
12FLX540	FL540					6.9	13.3	10.9	106	UUT5

*Extrapolated batteries are similar in construction to those tested in UUT6

Table 9- Special Seismic Certification
Certified Subcomponents for 12V and 16V Battery Cabinets- Breakers

DCL Project Number: 45798-1901

Manufacturer: Electronic Systems Support
Product Line: Battery Cabinets
Seismic Level: Sds = 1.5g, z/h = 1.0

Breakers

Model No.	Manufacturer	Material	Approx. Dimensions (in)			Weight (lb.)	Number of Poles	Ampere Rating	System VDC	Handle Option	Unit
			Width	Depth	Height						
PowerPact J	Square D	Thermal-magnetic, molded case	4.1	3.4	7.5	5.3	2, 3	100-250	500	Handle Extension	UUT6
PowerPact J										No Handle Extension	UUT3, UUT4
LH-DC			6	3.9	11	16	2, 3	300-400		Handle Extension	Interpolated
LH-DC										No Handle Extension	Interpolated
LG3-DC			5.5	4.5	13.5	17	3	300-600		Handle Extension	Interpolated
LG3-DC										No Handle Extension	Interpolated
LG4-DC			7.3	4.5	13.5	26	4	700-1000		Handle Extension	Interpolated
LG4-DC										No Handle Extension	Interpolated
MH-DC			9	4.5	14	38	3	450-1000		Handle Extension	UUT1, UUT2, UUT5
MH-DC										No Handle Extension	Extrapolated*

*Breaker is a depopulated version of what was tested in UUT5

Breaker Options

Options	Digit 16, 16V Battery Cabinet Nomenclature	Digit 18, 12V Battery Cabinet Nomenclature	Manufacturer	Material	Unit
24 VDC Shunt Trip / Auxiliary Contact	A	A	Square D	Thermal-magnetic, molded case	UUT2
48 VDC Shunt Trip / Auxiliary Contact	B	B			UUT1
24 Under Voltage Release / Auxiliary Contact	C	C			UUT3
48 Under Voltage Release / Auxiliary Contact	D	D			UUT4
120 VDC Shunt Trip / Auxiliary Contact	H	E			UUT5
250 VDC Shunt Trip / Auxiliary Contact	E	F			UUT6
120 VDC Under Voltage Release / Auxiliary Contact	K	G			Extrapolated*
250 VDC Under Voltage Release/ Auxiliary Contact	G	H			Extrapolated*
24 VDC Under Voltage Release / Bell Alarm / Auxiliary Contact	N/A	J			Extrapolated*
Auxiliary Contact (Only)	F	K			UUT1, UUT2, UUT3, UUT4, UUT5 UUT6

Note:
*Under voltage release option features a coil that requires power to allow a breaker to turn on. The shunt option features the same coil, that when energized pushes a lever to trip a breaker and turn it off. Extrapolated units are similar in construction to options tested in UUT5 and UUT6.

Table 10- Special Seismic Certification
Tested Components

DCL Project Number: 45798-1901

Manufacturer: Electronic Systems Support

Product Line: Battery Cabinets

Tested Product Construction: Powder-coated carbon steel frame

Tested Options: Enclosures, batteries and breakers

Tested Mounting Description: Rigid base mounted

Model Number*	Construction Material	NEMA Rating	Dimensions (in)			Weight	Sds (g), z/h=1	Unit
			Width	Depth	Height			
ST65550480BLA00B	Powder-coated carbon steel	1	32.0	31.5	84.0	5,185	1.50	UUT1
ST35925240BLA00A	Powder-coated carbon steel	1	25.0	31.5	84.0	4,092	1.50	UUT2
ST65550288BL250C	Powder-coated carbon steel	1	32.0	31.5	84.0	3,300	2.00	UUT3
ST35xxx144BL250D	Powder-coated carbon steel	1	25.0	31.5	84.0	2,600	2.00	UUT4
ETC40AE40xxxxxH04E	Powder-coated carbon steel	1	40.0	29.5	78.7	4,710	2.00	UUT5
ETC40AE04xxxxxB16F	Powder-coated carbon steel	1	40.0	29.5	78.7	820	2.00	UUT6

*UUT4 shows "xxx" because the tested unit included 2 different types of batteries. UUT5 and UUT6 show "xxxxx" because each unit contained multiple types of batteries.

UUT1

UNIT UNDER TEST (UUT) Summary Sheet

Manufacturer: ESS

Product Line: Battery Cabinets

Model Number: ST65550480BLA00B

Product Construction Summary:

Powder coated carbon steel enclosure, NEMA 1.

Options / Component Summary:

Rigid base mounted. Enersys 16HX550F-FR lead acid batteries, Square D 450-1000 Amp breaker with handle extension and 48 VDC shunt trip / auxiliary contact.

Unit Mounting Description: UUT1 was rigid base-mounted to the shake table interface plate using (6) 1/2-inch diameter Grade 5 bolts and flat washers. The bolts were spaced 11 inches on center length-wise and 29 inches on center width-wise.

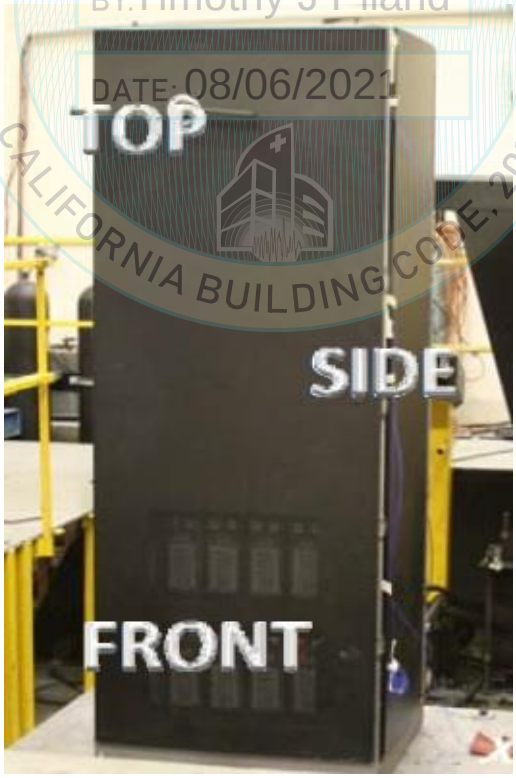
UUT Properties

Operating Weight (lb.)	Dimensions (in)				Lowest Natural Frequency (Hz)		
		Width	Depth	Height	Front-Back	Side-Side	Vertical
5,185	UUT1	32.0	31.5	84.0	4.8	5.8	>33.3

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 2019	ICC-ES AC156	1.50	1.0	1.5	2.40	1.80	1.00	0.40

Unit Mounting Description:



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

UUT2

UNIT UNDER TEST (UUT) Summary Sheet

Manufacturer: ESS

Product Line: Battery Cabinets

Model Number: ST35925240BLA00A

Product Construction Summary:

Powder coated carbon steel enclosure, NEMA 1.

Options / Component Summary:

Rigid base mounted. Enersys 16HX925F-FR lead acid batteries, Square D 450-1000 Amp breaker with handle extension and 24 VDC shunt trip / auxiliary contact.

Unit Mounting Description: UUT2 was rigid base-mounted to the shake table interface plate using (6) 1/2-inch diameter Grade 5 bolts and flat washers. The bolts were spaced 11 inches on center length-wise and 23 inches on center width-wise.

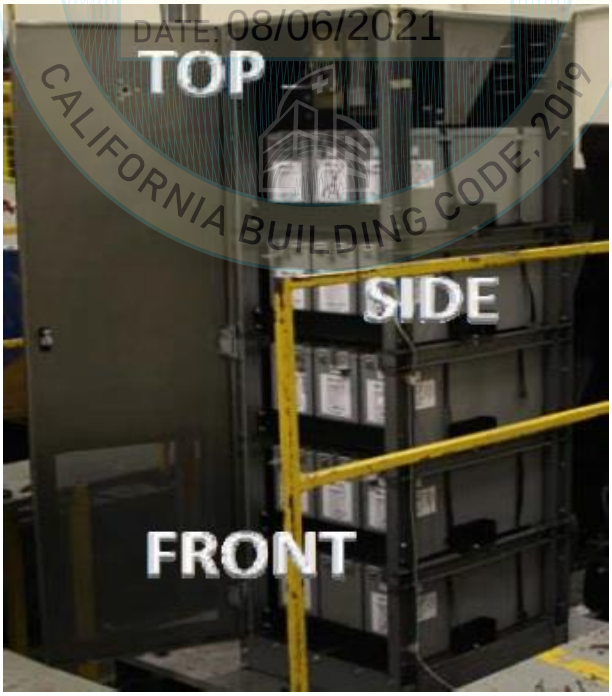
UUT Properties

Operating Weight (lb.)	Dimensions (in)				Lowest Natural Frequency (Hz)		
		Width	Depth	Height	Front-Back	Side-Side	Vertical
4,092	UUT2	25.0	31.5	84.0	6.6	3.6	17.7

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 2019	ICC-ES AC156	1.50	1.0	1.5	2.40	1.80	1.00	0.40

Unit Mounting Description:



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

UUT3

UNIT UNDER TEST (UUT) Summary Sheet

Manufacturer: ESS

Product Line: Battery Cabinets

Model Number: ST65550288BL250C

Product Construction Summary:

Powder coated carbon steel enclosure, NEMA 1.

Options / Component Summary:

Rigid base mounted. Enersys 16HX550F-FR lead acid batteries, Square D 100-250 Amp breaker with no handle extension and 24V under voltage release / auxiliary contact.

Unit Mounting Description: UUT3 was rigid base-mounted to the shake table interface plate using (6) 1/2-inch diameter Grade 5 bolts and flat washers. The bolts were spaced 11 inches on center length-wise and 29 inches on center width-wise.

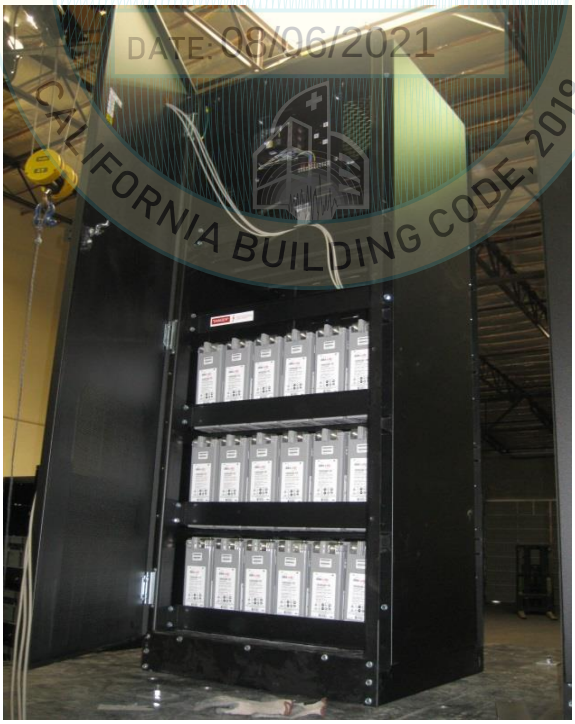
UUT Properties

Operating Weight (lb.)	Dimensions (in)				Lowest Natural Frequency (Hz)		
		Width	Depth	Height	Front-Back	Side-Side	Vertical
3,300	UUT3	32.0	31.5	84.0	10.8	13.8	>33.3

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 2019	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.33	0.53

Unit Mounting Description:



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

UUT4

UNIT UNDER TEST (UUT) Summary Sheet

Manufacturer: ESS

Product Line: Battery Cabinets

Model Number: ST35xxx144BL250D

Product Construction Summary:

Powder coated carbon steel enclosure, NEMA 1.

Options / Component Summary:

Rigid base mounted. Enersys 16HX800F-FR and 16HX925F-FR lead acid batteries, Square D 100-250 Amp breaker with no handle extension and 48V under voltage release / auxiliary contact.

Unit Mounting Description: UUT4 was rigid base-mounted to the shake table interface plate using (6) 1/2-inch diameter Grade 5 bolts and flat washers. The bolts were spaced 11 inches on center length-wise and 23 inches on center width-wise.

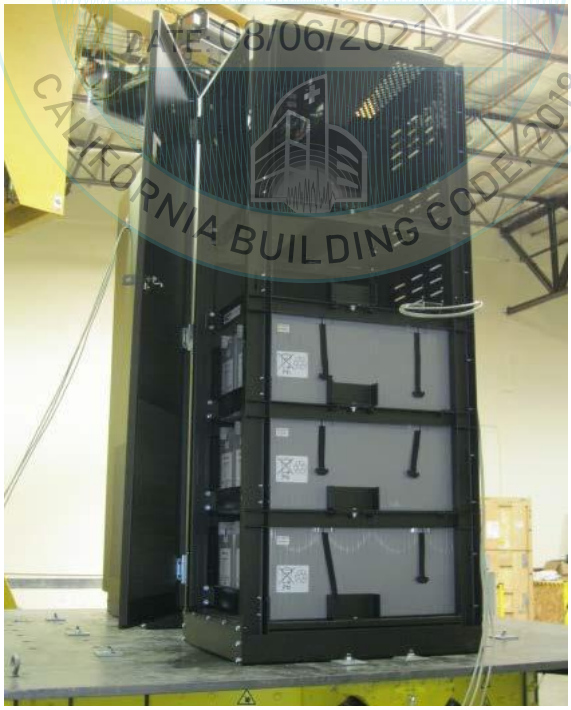
UUT Properties

Operating Weight (lb.)	Dimensions (in)				Lowest Natural Frequency (Hz)		
		Width	Depth	Height	Front-Back	Side-Side	Vertical
2,600	UUT4	25.0	31.5	84.0	10.8	8.0	19.0

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 2019	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.33	0.53

Unit Mounting Description:



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

UUT5

UNIT UNDER TEST (UUT) Summary Sheet

Manufacturer: ESS

Product Line: Battery Cabinets

Model Number: ETC40AE40xxxxxH04E

Product Construction Summary:

Powder coated carbon steel enclosure, NEMA 1.

Options / Component Summary:

Rigid base mounted. Enersys 12HX540, C&D UPS12-540MR, East Penn 31HR5500, CSB HRL12540W, GNB S12V550 and Fiamm 12FLX540 lead acid batteries, Square D 450-1000 Amp breaker with handle extension and 120VDC shunt trip / auxiliary contact.

Unit Mounting Description: UUT5 was rigid base-mounted to the shake table interface plate using (6) 5/8-inch diameter Grade 5 bolts and flat washers. The bolts were spaced 24 inches on center length-wise and 18 inches on center width-wise.

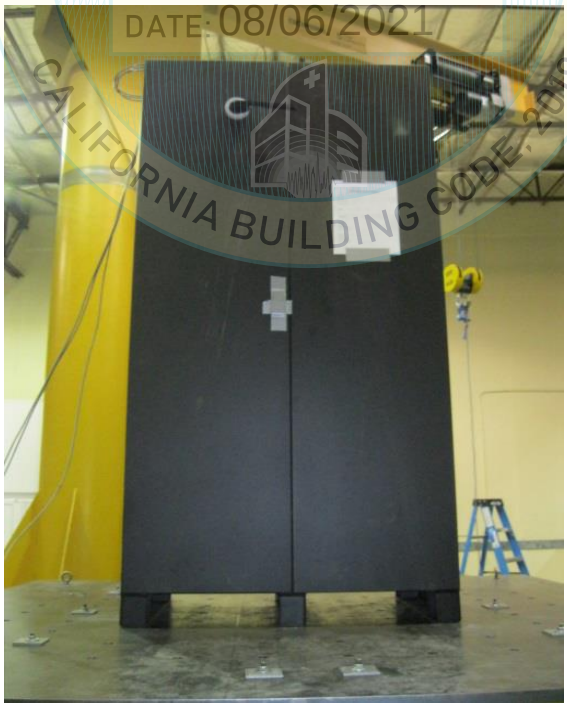
UUT Properties

Operating Weight (lb.)	Dimensions (in)				Lowest Natural Frequency (Hz)		
		Width	Depth	Height	Front-Back	Side-Side	Vertical
4,710	UUT5	40.0	29.5	78.7	8.3	7.8	19.8

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 2019	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.33	0.53

Unit Mounting Description:



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

UUT6

UNIT UNDER TEST (UUT) Summary Sheet

Manufacturer: ESS

Product Line: Battery Cabinets

Model Number: ETC40AE04xxxxxB16F

Product Construction Summary:

Powder coated carbon steel enclosure, NEMA 1.

Options / Component Summary:

Rigid base mounted. Enersys 12HX205, C&D UPS12-210MR, East Penn 45HR2000, CSB HRL12200W, GNB S12V285 and Fiamm 12FLX200 lead acid batteries, Square D 100-250 Amp breaker with handle extension and 240VDC shunt trip / auxiliary contact.

Unit Mounting Description: UUT6 was rigid base-mounted to the shake table interface plate using (6) 5/8-inch diameter Grade 5 bolts and flat washers. The bolts were spaced 24 inches on center length-wise and 18 inches on center width-wise.

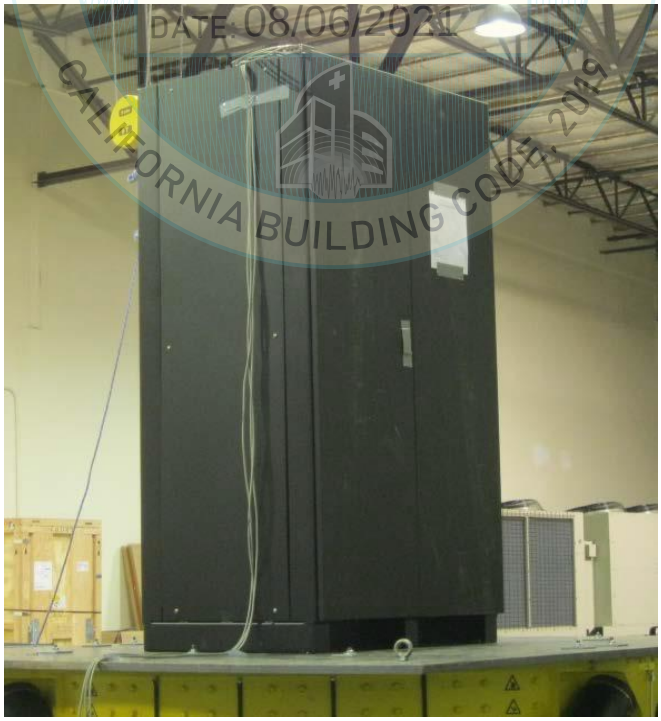
UUT Properties

Operating Weight (lb.)	Dimensions (in)				Lowest Natural Frequency (Hz)		
		Width	Depth	Height	Front-Back	Side-Side	Vertical
820	UUT6	40.0	29.5	78.7	18.8	13.8	30.5

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 2019	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.33	0.53

Unit Mounting Description:



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