APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0043

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: ABB (formerly GE)

Manufacturer's Technical Representative: Travis Ledford

Mailing Address: 6801 Industrial Drive, Mebane, NC 27302-2372

Telephone: (919) 563-7610 Email: travis.ledford@us.abb.com

Product Information

Product Name: Switchgear/Switchboards

Product Type: Switchgear - Low Voltage

Product Model Number: See Certified Product Matrix

General Description: ABB Entellisys, AKD-10, AKD-20 Low Voltage Switchgear in light gauge sheet metal framed enclosures

Mounting Description: Rigid, Floor Mounted

Tested Seismic Enhancements: None

Applicant Information

Applicant Company Name: WE Gundy & Associates, Inc

Contact Person: Travis Soppe

Mailing Address: PO Box 9121, Boise, ID 83707

Telephone: (208) 342-5989 Email: tsoppe@wegai.com

Title: President

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

Company Name: W.E. GUNDY & ASOCIATES INC.

Name: Travis Soppe California License Number: S6115

Mailing Address: P.O. Box 9121, Boise, ID 83707

Telephone: (208) 342-5989 Email: tsoppe@wegai.com

Certification Method

☐ GR-63-Core ☒ ICC-ES AC156 ☐ IEEE 344 ☐ IEEE 693 ☐ NEBS 3

☐ Other (Please Specify):

Testing Laboratory

Company Name: CLARK TESTING LABORATORY, INC.

Contact Person: Devon Lohr

Mailing Address: 1801 Route 51 South, Jefferson Hills PA 15025

Telephone: (412) 387-1027 Email: dlohr@clarktesting.com

Company Name: WYLE LABORATIORIES

Contact Person: Don Smith

Mailing Address: 7800 Highway 20 West, Huntsville AL 35806

Telephone: (256) 837-4411 Email: Don.smith@wyle.com

Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 1.0g for SDS = 1.33 with z/h = 1.0 and 0.96g for SDS = 2.13 with z/h = 0

S_{DS} (Design spectral response acceleration at short period, g) = 1.33 (z/h = 1), 2.13 (z/h = 0)

a_p (Amplification factor) = 2.5

R_p (Response modification factor) = 6.0

Ω_0 (System overstrength factor) = 2.5

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 1 and 0

Natural frequencies (Hz) = See attachment

Overall dimensions and weight = See attachment

OSHPD Approval (For Office Use Only) - Approval Expires on 09/30/2027

Date: 9/27/2021

Name: William Staehlin Title: Senior Structural Engineer

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

Condition of Approval (if applicable):

ABB INC. LOW VOLTAGE SWITCHGEAR
CERTIFIED PRODUCT LINE MATRIX

WEGAI
W.E. GUNDY & ASSOCIATES, INC.
STRUCTURAL & EARTHQUAKE ENGINEERING

Identification[1]	Description	NEMA[2]	Width (in)	Depth (in)	Height (in)	Weight (lbs)	Representative UUT [4,5]
Seismic Certification Limitations[3] - S_{DS} = 1.33 at z/h = 1.0 and S_{DS} = 2.13 at z/h = 0.0							
Entellisys-AT	Auxilliary / Transition	1	30	30	92	1100	UUT_a-1
Entellisys-AT	Auxilliary / Transition	1	30	30	92	1072	UUT_g-1
AKD-10 / AKD-20 (Entellisys)-AT	Auxilliary / Transition	1, 3R	22 - 38	54-83	78-96	850 - 1600	interpolated
Entellisys-AT	Auxilliary / Transition	1	22	60	92	870	UUT_c-1A
AKD-10-AT	Auxilliary / Transition	3R	30	69	110	1875	UUT_d-2A
AKD-10-AT	Auxilliary / Transition	3R	38	69	110	2375	UUT_d-2B
AKD-10-UM	Auxillary / Utility Metering	1	49	74	107	4165	UUT_e-2B
AKD-10-1H	(1) 4000A Breaker	1	38	67	107	2550	UUT_e-1B
AKD-10-1H	(1) 5000A Breaker	1	38	74	107	2435	UUT_e-2A
AKD-10 Entellisys-1H	(1) 4000A Breaker	1	30	60	92	2435	UUT_c-1B
AKD-10 Entellisys-1H	(1) 2000A Breaker	1	30	60	84	2435	UUT_f-1B
AKD-10 / AKD-20 (Entellisys)-1H	(1) 800A to 5000A Breaker	1, 3R	22-38	60-74	78-92	1750-2820	interpolated
AKD-10 / AKD-20 (Entellisys)-2H	(2) 800A to 5000A Breakers	1, 3R	22-38	60-74	78-92	1750-3625	interpolated
AKD-10 Entellisys-2H	(1) 800A and (1) 2000A Breaker	1	22	60	92	1784	UUT_c-1C
AKD-10 Entellisys-2H	(1) 800A and (1) 2000A Breaker	1	22	60	84	1784	UUT_f-1A/C
AKD-20-2H	(1) 4000A and (1) 5000A Breaker	1	38	54	96	3613	UUT_d-1B
AKD-10 / AKD-20 (Entellisys)-3H	(3) 800A to 5000A Breakers	1, 3R	22-38	60-74	78-92	1750-2500	interpolated
AKD-10-4H	(2) 1600A and (2) 2000A Breakers	1	22	67	107	1870	UUT_e-1A
AKD-10 / AKD-20 (Entellisys)-4H	(4) 800A to 5000A Breakers	1, 3R	22-38	60-74	78-92	1750-2875	interpolated
AKD-20-4H	(2) 1200A and (2) 3200A Breakers	1	22	54	96	2869	UUT_d-1A

General Notes:

1. All components are manufactured by ABB, Inc. unless noted. The part numbers listed uniquely identyf the type of component, manufacturer, and material of construction for each sub-component with the tested units.
2. NEMA 1/3R enclosures are constructed of carbon steel.
3. The maximum seismic certification limits presented for the product lines are limited to the maximum achieved seismc level of the tested units. Some units achieved higher seismic ratings however the product line is limited to the lowest seismic rating.
4. Standalone sections of switchgear are not seismically certified. A minumum of 2 mated sections is required for seismic certfication.
5. Subscript indicates the test report in which the units were qualified:
   $_a$ - 8387, $_c$ - 8001, $_d$ - 14-0033, $_e$ - 53022-1, $_f$ - 6938, $_g$-16095

ABB INC. LOW VOLTAGE SWITCHGEAR CERTIFIED SUBCOMPONENT MATRICES

WEGAI
W.E. GUNDY & ASSOCIATES, INC.
STRUCTURAL & EARTHQUAKE ENGINEERING

ID/Catalog Number	Manufacturer	Description	Weight (lbs)	Representative UUT [1]
EntelliGuard G (EGG) Circuit Breakers				
GA*, GN*, EE*	GE	EGG Frame I 800A - 1200A	114	extrapolated
GN12S1X		EGG Frame I 1200A	114	UUT_d-1
GA*, GN*, EE*		EGG Frame I, II, III 1200A - 5000A	114-336	interpolated
GA40L1X		EGG Frame III 4000A	336	UUT_d-1
WavePro (WE) Circuit Breakers				
WE*	GE	WE 800A - 1600A	225-285	extrapolated
WEMGAQMF11AAXBX		WE 1600A	285	UUT_e-1
WE*		WE 1600A - 4000A	285-545	interpolated
WE4NCQMF11AAXBX		WE 4000A	545	UUT_e-1
WE*		WE 4000A - 5000A	545-610	interpolated
WE3RCQSF11BAXBX		WE 5000A	610	UUT_e-2
EntelliGuard (EG) Circuit Breakers				
EG3A1BXX	GE	EG 800A	137	UUT_c-1 / UUT_f-1
EG*		EG 800A - 4000A	137-271	interpolated
EG1H1XXX		EG 2000A	203	UUT_f-1 / UUT_c-1
EG1M1NXX		EG 4000A	271	UUT_c-1
Surge Protective Device (SPD)				
TPHE277Y12SG	GE	TVSS-GE HE Series 480VAC L-L 277 VAC L-N	24	UUT_d-2
TPHE277Y15SG			24	interpolated
TPHE277Y20SG			24	interpolated
TPHE277Y25SG			24	interpolated
TPHE277Y30SG			24	UUT_d-2
Transformers (copper windings)				
9T22B4311	AFP	CPT, 5kVA 480/240-240/120	70	extrapolated
9T22B4341		CPT, 5kVA 600-240/120	75	extrapolated
870211711		CPT, 5kVA 380/400/416-100/120	85	extrapolated
9T22B4312		CPT, 7.5kVA 480/240-240/120	110	UUT_d-2
9T22B4313		CPT, 10kVA 480/240-240/120	125	interpolated
9T22B4314		CPT, 15kVA 480/240-240/120	165	interpolated
9T22B4315		CPT, 25kVA 240/480-120/240	255	interpolated
870214352		CPT 30kVA 480/240-240/120	335	UUT_d-2

General Notes:

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ABB INC. LOW VOLTAGE SWITCHGEAR CERTIFIED SUBCOMPONENT MATRICES

WEGAI
W.E. GUNDY & ASSOCIATES, INC.
STRUCTURAL & EARTHQUAKE ENGINEERING

ID/Catalog Number	Manufacturer	Description	Weight (lbs)	Representative UUT [1]
Transformers (copper windings) - continued				
9T*	GE	Control Power Transformer 0.05-1kVA	18	extrapolated
9T58k2812		Control Power Transformer 1kVA	18	UUT_e-1
9T*		Control Power Transformer 1-5kVA	52	interpolated
9T22B4311		Control Power Transformer 5kVA	69	UUT_c-1
3VT468SD35779FF	GE ITI	Control Power Transformer	8	UUT_a-1
560***		Current Transformer	6	extrapolated
561-SD-36518			8	UUT_c-1
561***, 562***, 563***			8	interpolated
563-402-0.6			12	UUT_c-1
3P589			14	UUT_f-1
3P589-162-0.6			15	UUT_c-1
0173B4776P0**	Amran	Current Transformer	5	UUT_d-1
0275B9556P0**			6	interpolated
0275B9440P0**			9	interpolated
0173B4780P0**			10	UUT_d-1
3VTL460-288	GE Multilin	Inst. Trans. INC 3PH PT 288/120V 100VA	24	UUT_e-1
BM1145	DUFRANE	Multi Ratio CT 8000/6400/6000/5000:0.8A	12	UUT_e-2
460-069	GE ITI	Auxiliary Power Transformer 1 PH-500VA	8	UUT_d-2
460-120			8	interpolated
460-208			8	interpolated
460-240			8	interpolated
460-277			8	interpolated
460-288			8	interpolated
460-300			8	interpolated
460-346			8	interpolated
460-480			8	interpolated
460-600			8	UUT_d-2
3VTL460-120		Power Transformer 3PH-100VA	24	UUT_d-2
3VTL460-208			24	interpolated
3VTL460-240			24	interpolated
3VTL460-288			24	interpolated
3VTL460-480			24	interpolated
3VTL460-600			24	UUT_d-2

General Notes:

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ABB INC. LOW VOLTAGE SWITCHGEAR CERTIFIED SUBCOMPONENT MATRICES

ID/Catalog Number	Manufacturer	Description	Weight (lbs)	Representative UUT [1]
Transformers (copper windings) - continued				
450-069	GE ITI	Auxiliary Power Transformer 69/120V-600/120V	25	extrapolated
450-120			25	extrapolated
450-208			25	extrapolated
450-240			25	extrapolated
450-277			25	extrapolated
450-288			25	extrapolated
450-300			25	extrapolated
450-346			25	extrapolated
450-480			25	UUT_d-2
450-600			25	UUT_d-2
Communication				
VTPC150P	Vartech	HMI	21	UUT_d-2
MPC-2197Z	Moxa	HMI	17	UUT_g-1
DSP-DFM	I-GARD	Feeder Module	1	UUT_d-2
IC693ACC305	GE Fanuc	EEPROM for PLC	5	UUT_e-2
IC693CPU311	GE Fanuc	PLC	5	UUT_e-2
IC693PWR321	GE Fanuc	PLC Power Supply	5	UUT_e-2
A0126571	GE	NETSCREEN 5GT (VPN)	2	UUT_f-1
0239C4231G001	ETS	64-128 point I/O system CPU	17	UUT_a-1, UUT_g-1
0239C4231G002			17	interpolated
0239C4231G003			17	interpolated
0239C4231G004			17	interpolated
0239C4231G005			17	UUT_a-1
0239C4231G006			17	extrapolated
0239C4231G007			17	extrapolated
0239C4231G008			17	extrapolated
0239C4231G009			17	extrapolated
Auto Charge Trip Devices				
CTDB-6-120	GE ITI	120 VAC Input	1	UUT_d-2
CTDB-6-240		240 VAC Input	1	UUT_d-2
Power Management Systems				
PLZOOMG01	GE	Modbus Concentrator	4	UUT_e-1
0122B5103G001		VH3000UL	75	UUT_a-1, UUT_g-1
UPS25511		VH1000UPS	50	UUT_d-2
UPS25513		VH2000UPS	70	UUT_d-2

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ABB INC. LOW VOLTAGE SWITCHGEAR CERTIFIED SUBCOMPONENT MATRICES

ID/Catalog Number	Manufacturer	Description	Weight (lbs)	Representative UUT [1]
Power Supplies				
SWS50-5	Lambda	50W	1	UUT_f-1
SWS***		50-150W	2	interpolated
SWS150-12		150W	2	UUT_c-1
A11-C21306-E	American Solenoid	33W Switch, POS SW	1	UUT_c-1
PLPS4G01	GE	PL	6	UUT_e-1
RWS150B-24	Lambda	150W	1	UUT_g-1
Relays				
70G-IAC5	Grayhill	I/O input relay	1	UUT_f-1
70G***		I/O input relay	1	interpolated
70G-ODC5R		I/O input relay	1	UUT_f-1
70GRCK16I-DIN		Relay block 16 channel	1	UUT_f-1
RL4RA022TJ	GE	C2000 Aux 120V	1	UUT_e-2
HEA61A223-X2		High Speed Multi Conctact	2	UUT_d-2
HEA61*		High Speed Multi Conctact	4	interpolated
HEA62C238-X2		High Speed Multi Conctact	8	UUT_d-2
BE3-47N-3S4N2	Basler	Phase Balance, 3PH 3 Wire 208VAC	1	UUT_d-2
BE3-27-1A1N2		Phase Balance	1	interpolated
BE1-47NE5FE1PC3T3F		Negative SEQ Voltage 3PH 208V	14	UUT_d-2
BE1-700-N4N3X1N		Digital Voltage 3PH Sensing	4	UUT_d-2
2966650	Phoenix Contact	I/O input relay	0.1	UUT_g-1
2688349		16 Output Module	0.3	UUT_g-1
2688310		16 Input Module	0.4	UUT_g-1
2701815		Bus Coupler	0.5	UUT_g-1
Fuses				
0T3	Mersen	3A	1	UUT_e-1 / UUT_e-2
AJT3		3A	1	UUT_e-1
0T10		10A	1	UUT_e-1 / UUT_e-2
AJT20		20A	1	UUT_e-2
ATM15		15A 600VAC/500VDC	1	UUT_e-1
TR30R		Trionic	1	UUT_e-2
A4J6		6A	1	UUT_c-1
AJT25		25A	1	UUT_c-1
TR40R		Trionic	1	UUT_c-1

General Notes:

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ABB INC. LOW VOLTAGE SWITCHGEAR CERTIFIED SUBCOMPONENT MATRICES

WEGAI
W.E. GUNDY & ASSOCIATES, INC.
STRUCTURAL & EARTHQUAKE ENGINEERING

ID/Catalog Number	Manufacturer	Description	Weight (lbs)	Representative UUT [1]
Fuses-con'td				
H25030-1S	Bussman	Fuse Block	1	UUT_e-1
HPS		Fuse Block	1	UUT_e-1 / UUT_e-2
15149-2		Fuse Block	2	UUT_c-1
15149-3		Fuse Block	2	UUT_c-1
PFS-3311	Challenger	Fuse Block	1	UUT_e-2
Neutral Sensor Frames				
0173B5112P001	Amran	Frame I 400A	1	extrapolated
0173B5112P002		Frame I 600A	1	extrapolated
0173B5112P003		Frame I 800A	1	extrapolated
0173B5112P004		Frame I 1000A	1	extrapolated
0173B5112P005		Frame I 1200A	1	UUT_d-1
0173B5112P006		Frame I 1600A	1	interpolated
0173B5112P007		Frame I 2000A	1	UUT_d-1
0173B5113P001		Frame II 400A	1	interpolated
0173B5113P002		Frame II 600A	1	interpolated
0173B5113P003		Frame II 800A	1	interpolated
0173B5113P004		Frame II 1000A	1	interpolated
0173B5113P005		Frame II 1200A	1	interpolated
Neutral Sensor Frames - cont'd				
0173B5113P006	Amran	Frame II 1600A	1	interpolated
0173B5113P007		Frame II 2000A	1	UUT_d-1
0173B5113P008		Frame II 2500A	1	extrapolated
0173B5113P009		Frame II 3200A	1	extrapolated
Accessories				
0209B4841G009	GE ITI	ET16 120VAC/125VDC	1	UUT_e-1
0139C4970G164		MVT Neutral Sensor 600-1600A	2	UUT_e-1
0139C4970G165		MVT Neutral Sensor 800-2000A	2	UUT_e-1
0239B6136G001		Voltage conditioner 120VAC door	1	UUT_e-1
ETSMSGR00	GE	Breaker Messenger	8	UUT_c-1
16SB1B11X2		SB1 Control/Transfer Switch - PCB Cont. SW 1 STG	2	UUT_e-1
16SB1***		SB1 Control Switch	2	interpolated
16SB1UB202LSM2V		SB1 Control Selector Switch 2 pos/16 stg.	8	UUT_d-1

General Notes:

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$_a$ - 8387, $_c$ - 8001, $_d$ - 14-0033, $_e$ - 53022-1, $_f$ - 6938, $_g$ - 16095

ABB INC. LOW VOLTAGE SWITCHGEAR
CERTIFIED SUBCOMPONENT MATRICES

WEGAI
W.E. GUNDY & ASSOCIATES, INC.
STRUCTURAL & EARTHQUAKE ENGINEERING

ID/Catalog Number	Manufacturer	Description	Weight (lbs)	Representative UUT [1]
Accessories - cont'd				
3100365103A001	Rigel Engineering	CPU	5	UUT_g-1
EDR-810	Moxa	Firewall	2	UUT_g-1
SDS-3008-T	Moxa	Ethernet Switch	1	UUT_g-1
508TX	N-Tron	Ethernet Switch	2	UUT_e-1

General Notes:

[1] Subscript indicates the test report in which the units were qualified:
$_a$ - 8387, $_c$ - 8001, $_d$ - 14-0033, $_e$ - 53022-1, $_f$ - 6938, $_g$ - 16095

UUT_a-1	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/2" diameter grade 5 bolts.

Manufacturer: ABB	**Test Location:** Clark Test Laboratory
Product Line: Low Voltage Switchgear	**Test Date:** November / December 2007
Model Number: Entellisys-AT	**Report Number:** 8387

UUT Function: Power control system to monitor, operate and troubleshoot switchgear

UUT Description: The unit is comprised of a floor mounted NEMA type 1 enclosure consisting of control components.

UUT Components: NEMA 1 12ga Carbon Steel Enclosure; Control Power Transformer, HMI, CPU, 64-point I/O system CPU and UPS Assembly 50/60Hz

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
1,100	30	30	92	12.5	10.1	>33

SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	2.00	1.00	1.50	3.20	2.40	-	-
	2.50	0.00	1.50	-	-	1.67	0.67

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.

UUT_g-1	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/2" diameter grade 5 bolts.

Manufacturer: ABB	**Test Location:** ETL
Product Line: Low Voltage Switchgear	**Test Date:** March 2021
Model Number: Entellisys-AT	**Report Number:** 16095
UUT Function: Power control system to monitor, operate and troubleshoot switchgear	
UUT Description: The unit is comprised of a floor mounted NEMA type 1 enclosure consisting of control components.	
UUT Components: NEMA 1 12ga Carbon Steel Enclosure; HMI (MPC-2197Z), Power Supplies (RWS150B-24), Relays (2701815, 2688310, 2688349, 2966650, 1201662), CPU (3100365103A001), Firewall (EDR-810), Ethernet Switch (SDS-3008-T), and UPS (VH3000).	

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
1,072	30	30	92	10.9	9.8	>33

SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	2.00	1.00	1.50	3.20	2.40	-	-
	2.50	0.00	1.50	-	-	1.67	0.67

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.

UUT_c-1A	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/2" diameter grade 5 bolts.

Manufacturer: ABB	**Test Location:** Clark Test Laboratory
Product Line: Low Voltage Switchgear	**Test Date:** January 2006
Model Number: Entellisys-AT	**Report Number:** 8001

UUT Function: Power control system to monitor, operate and troubleshoot switchgear

UUT Description: The unit is comprised of a floor mounted NEMA type 1 enclosures with enclosed control components.

UUT Components: NEMA 1 12ga Carbon Steel Enclosure; 9T22B4311 CPT, GE ITI Current Transformers, Power Supplies, and Fuses

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
870	22	60	92	30.5	15.6	>33

SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	1.44	1.00	1.50	2.30	1.73	-	-
	2.30	0.00	1.50	-	-	1.54	0.62

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.

UUT_c-1B	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/2" diameter grade 5 bolts.

Manufacturer: ABB	**Test Location:** Clark Test Laboratory
Product Line: Low Voltage Switchgear	**Test Date:** January 2006
Model Number: AKD-10 Entellisys-1H	**Report Number:** 8001

UUT Function: Synchonization of multiple power sources to main bus for distribution of electricity

UUT Description: The unit is comprised of a floor mounted NEMA type 1 enclosure with bus and one high single circuit breaker.

UUT Components: NEMA 1 12ga Carbon Steel Enclosure, EG1M1NXX 4000A Breaker, GE ITI Current Transformers, Power Supplies, and Fuses

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
2,435	30	60	92	30.5	15.6	>33

SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	1.44	1.00	1.50	2.30	1.73	-	-
	2.30	0.00	1.50	-	-	1.54	0.62

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.

UUT_c-1C	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/2" diameter grade 5 bolts.

Manufacturer: ABB	**Test Location:** Clark Test Laboratory
Product Line: Low Voltage Switchgear	**Test Date:** January 2006
Model Number: AKD-10 Entellisys-2H	**Report Number:** 8001

UUT Function: Synchonization of multiple power sources to main bus for distribution of electricity

UUT Description: The unit is comprised of a floor mounted NEMA type 1 enclosure with bus and two high circuit breakers.

UUT Components: NEMA 1 12ga Carbon Steel Enclosure, EG3A1BXX 800A Breaker, EG1H1XXX 2000A Breaker

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
1,784	22	60	92	30.5	15.6	>33

SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	1.44	1.00	1.50	2.30	1.73	-	-
	2.30	0.00	1.50	-	-	1.54	0.62

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.

UUT_d-1A	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/2" diameter grade 5 bolts.

Manufacturer: ABB	**Test Location:** Clark Test Laboratory
Product Line: Low Voltage Switchgear	**Test Date:** March 2014
Model Number: AKD-20-4H	**Report Number:** 14-0033

UUT Function: Synchonization of multiple power sources to main bus for distribution of electricity

UUT Description: The unit is comprised of a floor mounted NEMA type 1 enclosure with bus and four high circuit breakers.

UUT Components: NEMA 1 12ga Carbon Steel Enclosure, GN12S1X 1200A Breaker, GN20N1X 2000A Breaker, GA20E1X 2000A Breaker Breaker, Neutral Sensor Frames

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
2,869	22	54	96	9.0	8.36	30.7

SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	1.33	1.00	1.50	2.13	1.6	-	-
	2.13	0.00	1.50	-	-	1.43	0.58

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.

UUT_d-1B	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/2" diameter grade 5 bolts.

Manufacturer: ABB	**Test Location:** Clark Test Laboratory
Product Line: Low Voltage Switchgear	**Test Date:** March 2014
Model Number: AKD-20-2H	**Report Number:** 14-0033

UUT Function: Synchonization of multiple power sources to main bus for distribution of electricity

UUT Description: The unit is comprised of a floor mounted NEMA type 1 enclosure with bus and two high circuit breakers.

UUT Components: NEMA 1 12ga Carbon Steel Enclosure, GA40L1X 4000A Breaker, Neutral Sensor Frames

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
3,613	38	54	96	9.0	8.36	30.7

SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	1.33	1.00	1.50	2.13	1.6	-	-
	2.13	0.00	1.50	-	-	1.43	0.58

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.

UUT_d-2A	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/4"-12" long fillet welds.

Manufacturer: ABB	**Test Location:** Clark Test Laboratory
Product Line: Low Voltage Switchgear	**Test Date:** March 2014
Model Number: AKD-10-AT	**Report Number:** 14-0033

UUT Function: Power control system to monitor, operate and troubleshoot switchgear

UUT Description: The unit is comprised of a standalone floor mounted NEMA type 3R enclosure with internal control components.

UUT Components: NEMA 3R 12ga Carbon Steel Enclosure, SPD, 9T22B4312 CPT, 870214352 CPT, GE ITI Power Transformers, Vartech HMI, VH1000UPS, VH2000UPS, multiple control components.

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
1,875	30	69	110	21.2	6.41	26.2

SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	1.33	1.00	1.50	2.13	1.6	-	-
	2.13	0.00	1.50	-	-	1.43	0.58

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.

UUT_d-2B	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/4"-12" long fillet welds.

Manufacturer: ABB	**Test Location:** Clark Test Laboratory
Product Line: Low Voltage Switchgear	**Test Date:** March 2014
Model Number: AKD-10-AT	**Report Number:** 14-0033

UUT Function: Power control system to monitor, operate and troubleshoot switchgear

UUT Description: The unit is comprised of a standalone floor mounted NEMA type 3R enclosure with internal control components.

UUT Components: NEMA 3R 12ga Carbon Steel Enclosure, SPD, 9T22B4312 CPT, 870214352 CPT, GE ITI Power Transformers, Vartech HMI, VH1000UPS, VH2000UPS, multiple control components.

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
2,375	38	69	110	21.2	6.41	26.2

SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	1.33	1.00	1.50	2.13	1.6	-	-
	2.13	0.00	1.50	-	-	1.43	0.58

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.

UUT_e-1A	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/2" diameter grade 5 bolts.

Manufacturer: ABB	**Test Location:** Wyle Laboratory, Inc.
Product Line: Low Voltage Switchgear	**Test Date:** December 2005
Model Number: AKD-10-3H	**Report Number:** 53022-1

UUT Function: Synchonization of multiple power sources to main bus for distribution of electricity.

UUT Description: The unit is comprised of a floor mounted NEMA type 1 enclosure with NEMA-3R drip roof, bus, and three high circuit breaker stack.

UUT Components: NEMA 1 12ga Carbon Steel Enclosure, WEMGAQMF11AAXBX 1600A Breaker, WE1JLPMF11AAXBX 2000A Breaker.

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
1,870	22	67	107	8.1	5.4	8.5

SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	1.38	1.00	1.50	2.20	1.66	-	-
	2.20	0.00	1.50	-	-	1.47	0.59

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.

UUT_e-1B	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/2" diameter grade 5 bolts.

Manufacturer: ABB	**Test Location:** Wyle Laboratory, Inc.
Product Line: Low Voltage Switchgear	**Test Date:** December 2005
Model Number: AKD-10-1H	**Report Number:** 53022-1

UUT Function: Synchonization of multiple power sources to main bus for distribution of electricity.

UUT Description: The unit is comprised of a floor mounted NEMA type 1 enclosure with NEMA-3R drip roof, bus, and single high circuit breaker.

UUT Components: NEMA 1 12ga Carbon Steel Enclosure, WE4NCQMF11AAXBX 4000A Breaker, 9T58K2812 CPT, Fuse Blocks, MVT Neutral Sensor, PL Power Supply, Control and Transfer Switch.

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
2,550	38	67	107	8.1	5.4	8.5

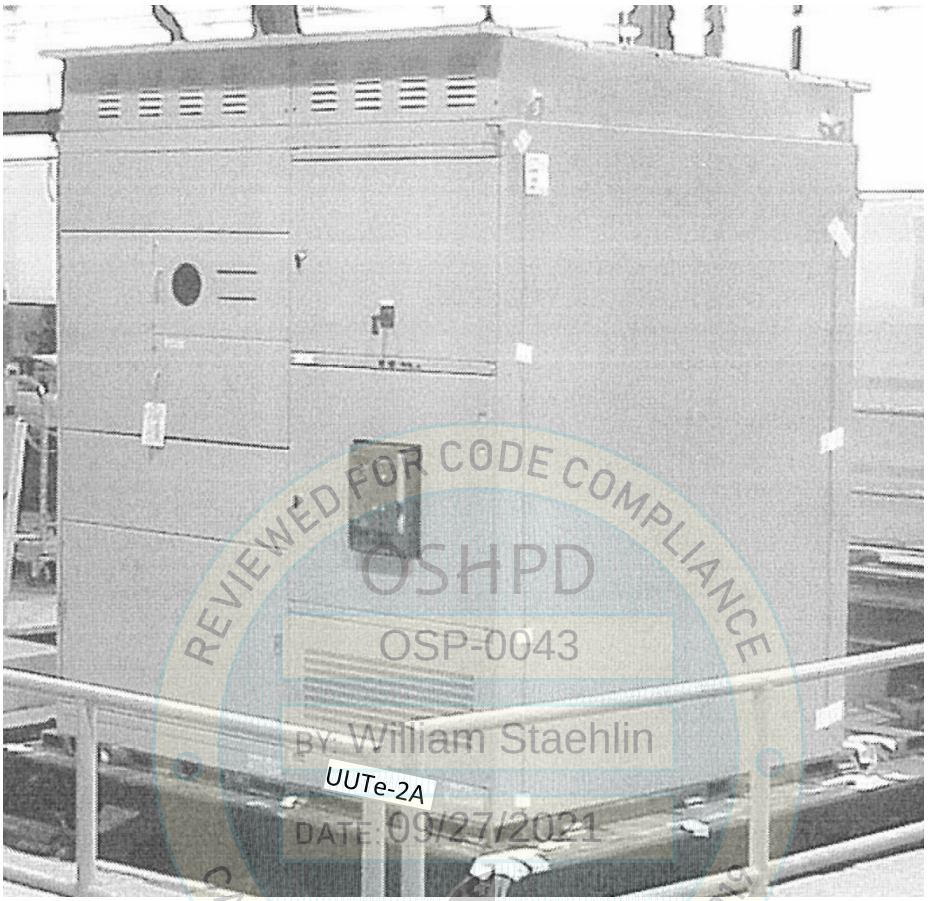
SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	1.38	1.00	1.50	2.20	1.66	-	-
	2.20	0.00	1.50	-	-	1.47	0.59

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.

UUT_e-2A	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/2" diameter grade 5 bolts.



Manufacturer: ABB	**Test Location:** Wyle Laboratory, Inc.
Product Line: Low Voltage Switchgear	**Test Date:** December 2005
Model Number: AKD-10-1H	**Report Number:** 53022-1

UUT Function: Synchonization of multiple power sources to main bus for distribution of electricity

UUT Description: The unit is comprised of a floor mounted NEMA type 1 enclosure with NEMA-3R drip roof, bus, and single high breaker.

UUT Components: NEMA 1 12ga Carbon Steel Enclosure, WE3RCQSF11BAXBX 5000A Breaker, power supply, fuse blocks.

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
2,435	38	74	107	8.5	7.5	>33

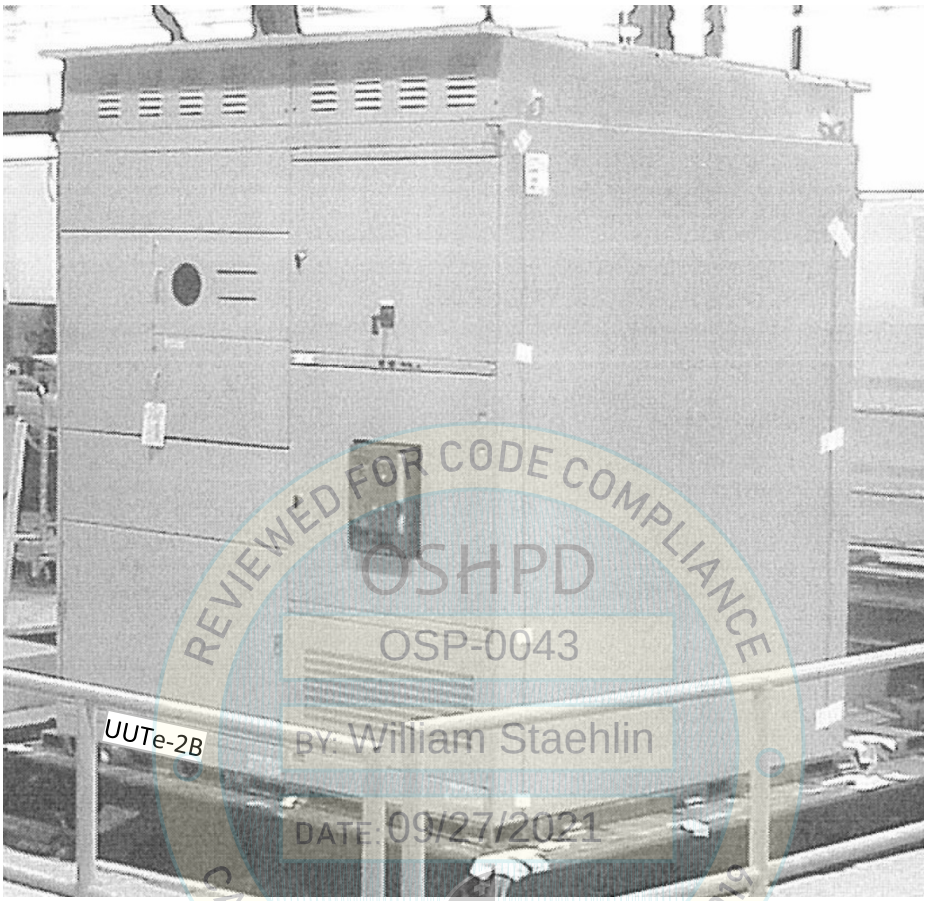
SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	1.38	1.00	1.50	2.20	1.66	-	-
	2.20	0.00	1.50	-	-	1.47	0.59

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.

UUT_e-2B	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/2" diameter grade 5 bolts.



Manufacturer: ABB	**Test Location:** Wyle Laboratory, Inc.
Product Line: Low Voltage Switchgear	**Test Date:** December 2005
Model Number: AKD-10-UM	**Report Number:** 53022-1

UUT Function: Synchonization of multiple power sources to main bus for distribution of electricity

UUT Description: The unit is comprised of a floor mounted NEMA type 1 enclosure with NEMA-3R drip roof, bus, and utility meter components.

UUT Components: NEMA 1 12ga Carbon Steel Enclosure, utility metering components, power supply, fuse blocks.

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
4,165	49	74	107	8.5	7.5	>33

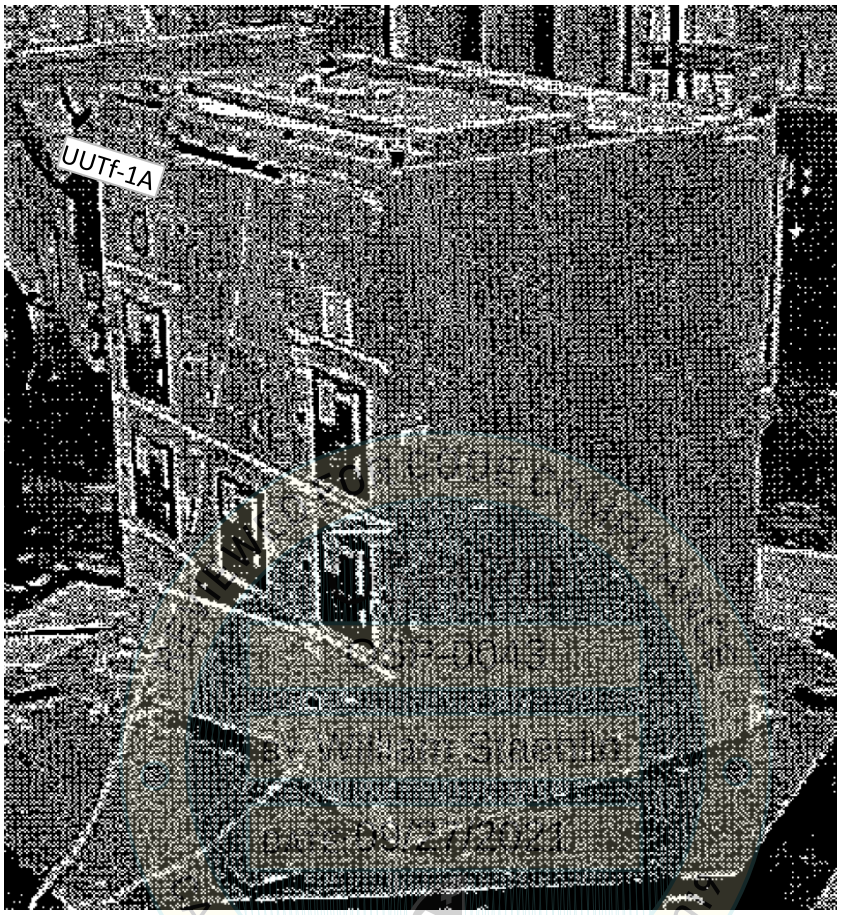
SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	1.38	1.00	1.50	2.20	1.66	-	-
	2.20	0.00	1.50	-	-	1.47	0.59

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.

UUT_f-1A	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/2" diameter grade 5 bolts.



Manufacturer: ABB	**Test Location:** Clark Test Laboratory
Product Line: Low Voltage Switchgear	**Test Date:** September 2005
Model Number: AKD-10 Entellisys-2H	**Report Number:** 6938

UUT Function: Synchonization of multiple power sources to main bus for distribution of electricity

UUT Description: The unit is comprised of a floor mounted NEMA type 1 enclosure, bus, and double stack breaker configuration.

UUT Components: NEMA 1 12ga Carbon Steel Enclosure, EG3A1XXX 800A Breaker, EG1H1XXX 2000A Breaker, CT Current Transformers, Power Supply

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
1,784	22	60	84	22.6	8.6	> 33

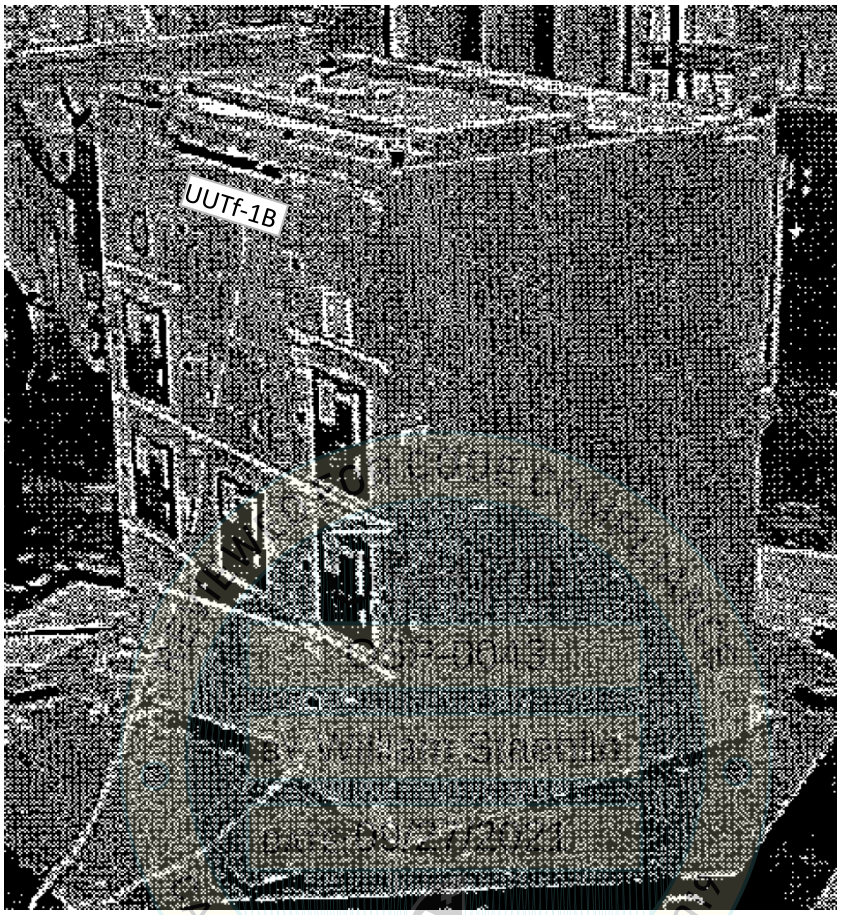
SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	1.67	1.00	1.50	2.67	2.00	-	-
	2.67	0.00	1.50	-	-	1.79	0.72

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.

UUT_f-1B	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/2" diameter grade 5 bolts.



Manufacturer: ABB	**Test Location:** Clark Test Laboratory
Product Line: Low Voltage Switchgear	**Test Date:** September 2005
Model Number: AKD-10 Entellisys-1H	**Report Number:** 6938

UUT Function: Synchonization of multiple power sources to main bus for distribution of electricity

UUT Description: The unit is comprised of a floor mounted NEMA type 1 enclosure, bus, and single breaker configuration.

UUT Components: NEMA 1 12ga Carbon Steel Enclosure, EG1H1XXX 2000A Breaker, CT Current Transformers, Power Supply

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
2,433	30	60	84	22.6	8.6	> 33

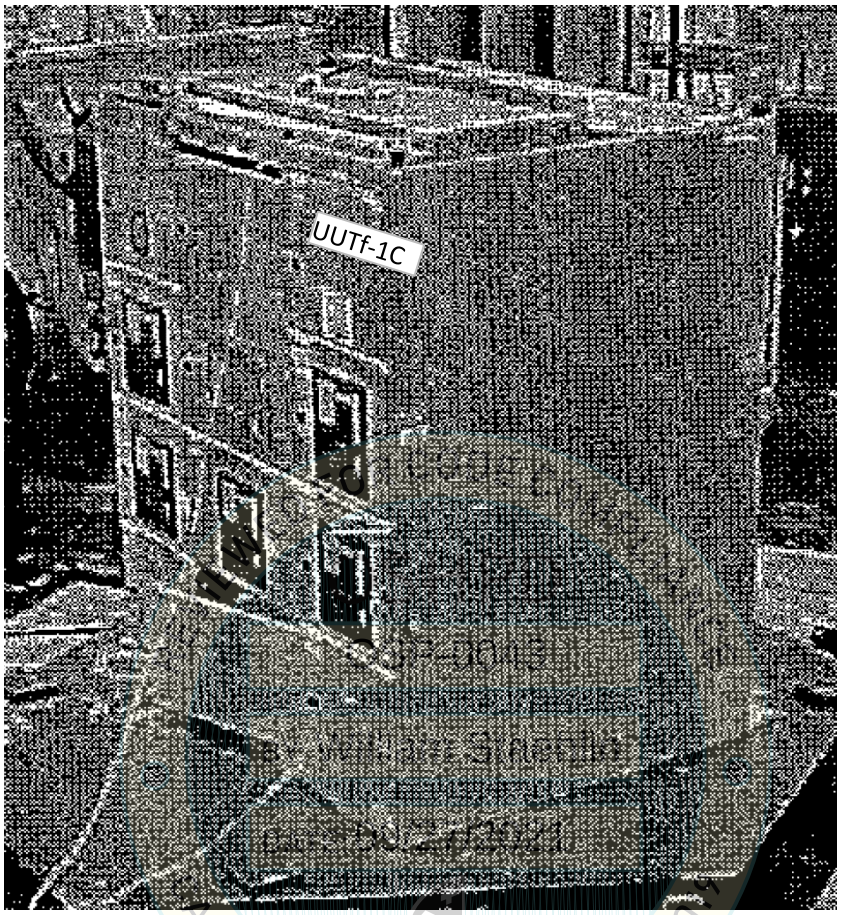
SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	1.67	1.00	1.50	2.67	2.00	-	-
	2.67	0.00	1.50	-	-	1.79	0.72

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.

UUT_f-1C	UNIT UNDER TEST (UUT) SUMMARY SHEET	WEGAI W.E. Gundy & Associates, Inc. Structural & Earthquake Engineering

Mounting Details: Floor mounted with (4) 1/2" diameter grade 5 bolts.



Manufacturer: ABB	**Test Location:** Clark Test Laboratory
Product Line: Low Voltage Switchgear	**Test Date:** September 2005
Model Number: AKD-10 Entellisys-2H	**Report Number:** 6938

UUT Function: Synchonization of multiple power sources to main bus for distribution of electricity

UUT Description: The unit is comprised of a floor mounted NEMA type 1 enclosure, bus, and double stack breaker configuration.

UUT Components: NEMA 1 12ga Carbon Steel Enclosure, EG3A1XXX 800A Breaker, EG1H1XXX 2000A Breaker, CT Current Transformers, Power Supply

UUT PROPERTIES

Weight (lb)	Dimensions (inches)			Natural Fequency (Hz)		
	Enclosure Width	Enclosure Depth	Enclosure Height	FB	SS	V
1,783	22	60	84	22.6	8.6	> 33

SEISMIC TEST PARAMETERS

Test Criteria	S_{DS} (g)	z / h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019 / ICC-ES-AC156	1.67	1.00	1.50	2.67	2.00	-	-
	2.67	0.00	1.50	-	-	1.79	0.72

Note: The unit was full of contents during testing and remained functional before and after the ICC-ES AC156 test. The unit maintained structural integrity during and after the ICC-ES AC156 Test.