APPLICATION FOR HCAI SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0056

HCAI Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: MGM Transformers

Manufacturer's Technical Representative: Mike Iman

Mailing Address: 5701 Smithway Street, City of Commerce, CA 90040

Telephone: (323) 726-0888 Email: miman@mgmtransfomer.com

Product Information

Product Name: Transformers

Product Type: Transformers – Dry Type

Product Model Number: General Purpose & Unit Substation Transformers

General Description: Dry-Type General Purpose & Unit Substation Transformers

Mounting Description: Rigid, Floor Mounted

Tested Seismic Enhancements: None

Applicant Information

Applicant Company Name: TRU Compliance, by Structural Integrity Associates, Inc.

Contact Person: Galen Reid

Mailing Address: 5215 Hellyer Ave. Suite 210, San Jose, CA 95138

Telephone: (541) 604-7225 Email: greid@structint.com

Title: Director, TRU Compliance

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

Company Name: STRUCTURAL INTEGRITY ASSOCIATES, INC.

Name: Andrew Coughlin California License Number: S6082

Mailing Address: 5215 Hellyer Ave, Suite 101, San Jose, CA 95138-1025

Telephone: (415) 635-8461 Email: acoughlin@structint.com

Certification Method

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

☐ Other (Please Specify):

Testing Laboratory

Company Name: Pacific Earthquake Engineering Research Center (PEER)

Contact Person: Amarnath Kasalanati

Mailing Address: 1301 South 46th St., Bldg. 420, Richmond CA 94804

Telephone: (510) 642-3437 Email: Amarnath1@berkeley.edu

Company Name: CLARK TESTING LABORATORY, INC.

Contact Person:

Mailing Address: 1801 Route 51, Jefferson Hills PA 15025

Telephone: () - Email:

Company Name: UNIVERSITY OF CALIFORNIA, BERKELEY (PEER)

Contact Person: Amarnath Kasalanati

Mailing Address: 1301 South 46th St., Bldg. 420, Richmond CA 94804

Telephone: (510) 642-6475 Email: peer_center@berkeley.edu

Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 1.44 (z/h = 1); 0.90 (z/h = 0)

S_{DS} (Design spectral response acceleration at short period, g) = 2.0

a_p (Amplification factor) = 1.0

R_p (Response modification factor) = 2.5

Ω_0 (System overstrength factor) = 2.0

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

HCAI Approval (For Office Use Only) - Approval Expires on 04/27/2028

Date: 4/27/2022

Name: Mohammad Karim Title: Supervisor, Health Facilities

Special Seismic Certification Valid Up to: S_{DS} (g) = 2.00 z/h = See Above

Condition of Approval (if applicable):

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

2200378-CR-001-R0

TRU COMPLIANCE

Manufacturer: MGM Transformer Company
Model Line: General Purpose & Unit Substation Transformers

TABLE 1

Certified Product Construction Summary:
Carbon steel enclosure. Open wound coil construction.

Certified Options Summary:
NEMA 1 or 3R construction. See Table 3 for possible product configurations and the significance of "X".
MGM Transformers can be rebranded as GE Energy Industrial Solutions, Eaton, Square D Company/Schneider Electric, Siemens Energy & Automation, or OnLine Power.

Mounting Configuration:
Base mounted - rigid
Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2019 ***Seismic Certification Limits:*** S_{DS}= ***2.0 g*** ***z/h=1.0*** S_{DS}= ***2.0 g*** ***z/h=0.0*** I_P= ***1.5***

Model Line	Model[1]	Dimensions (in)			Weight (lb)[2]	Notes	UUT
		Depth	Width	Height			
Unit Substation Transformers (Al - single phase)	AD2XX-XXXXX/HSXXXX2	50	56	90	1,970		Extrap.
	…	…	…	…	…		Extrap.
	AD2XX-XXXXX/HSXXXX2	50	64	90	2,250		Extrap.
Unit Substation Transformers (Cu - single phase)	AC2XX-XXXXX/HSXXXX1	50	56	90	1,970		Extrap.
	…	…	…	…	…		Extrap.
	AC2XX-XXXXX/HSXXXX1	50	90	100	3,165		Extrap.
	AC2XX-XXXXX/HSXXXX1	60	90	90	3,800		Extrap.
	…	…	…	…	…		Extrap.
	AC2XX-XXXXX/HSXXXX1	60	108	100	20,502		Extrap.
Unit Substation Transformers (Al - three phase)	AD3XX-XXXXX/HTXXXX2	50	56	90	1,970		Extrap.
	…	…	…	…	…		Extrap.
	AD374-Q0224	50	64	90	2,500		3
	…	…	…	…	…		Interp.
	AD3XX-XXXXX/HTXXXX2	50	90	100	3,516		Interp.
	AD3XX-XXXXX/HTXXXX2	60	90	90	4,219		Interp.
	…	…	…	…	…		Interp.
	AD3XX-XXXXX/HTXXXX2	60	108	108	20,502		Interp.
	AE381-Z0107	60	108	108	20,502	UUT6: Hybrid Cu/Al	6
Unit Substation Transformers (Cu - three phase	AC3XX-XXXXX/HTXXXX1	60	56	90	2,625		Interp.
	…	…	…	…	…		Interp.
	AC3XX-XXXXX/HTXXXX1	60	108	108	20,502		Interp.
	AE381-Z0107	60	108	108	20,502	UUT6: Hybrid Cu/Al	6

[1]"H" model numbering applies up to 600V class only and has identical construction to "A" models.
[2] Maximum operating weight and maximum allowed per enclosure depth dimensions.

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

2200378-CR-001-R0

TRU COMPLIANCE

Manufacturer: MGM Transformer Company
Model Line: General Purpose & Unit Substation Transformers

TABLE 2

Certified Product Construction Summary:
Carbon steel enclosure. Open wound coil construction.

Certified Options Summary:
NEMA 1 or 3R construction. See Table 3 for possible product configurations and the significance of "X".
MGM Transformers can be rebranded as GE Energy Industrial Solutions, Eaton, Square D Company/Schneider Electric, Siemens Energy & Automation, or OnLine Power

Mounting Configuration:
Base mounted - rigid
Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2019 ***Seismic Certification Limits:*** S_{DS}= ***2.0 g*** ***z/h=1.0*** S_{DS}= ***2.0 g*** ***z/h=0.0*** I_P= ***1.5***

Model Line	Model[1]	Dimensions (in)			Weight (lb)[2]	Notes	UUT
		Depth	Width	Height			
General Purpose Transformers (Al - single phase)	AD2XX-XXXXX/HSXXXX2	14.0	21.0	28.0	295		Extrap.
	…	…	…	…	…		Extrap.
	AD2XX-XXXXX/HSXXXX2	32.0	50.5	66.0	3,560		Extrap.
General Purpose Transformers (Cu - single phase)	AC2XX-XXXXX/HSXXXX1	14.0	21.0	28.0	295		Extrap.
	…	…	…	…	…		Extrap.
	AC2XX-XXXXX/HSXXXX1	32.0	50.5	66.0	3,560		Extrap.
General Purpose Transformers (Al - three phase)	AD3XX-XXXXX/HTXXXX2	14.0	21.0	28.0	325		Extrap.
	…	…	…	…	…		Extrap.
	AE374-N0227	21.0	36.5	40.5	1,086	UUT 4: Hybrid Cu/Al	4
	…	…	…	…	…		Interp.
	AD3XX-XXXXX/HTXXXX2	32.0	50.5	66.0	3,957		Interp.
	AE378-U0376	32.0	50.5	66.0	3,957	UUT 5: Hybrid Cu/Al	5
General Purpose Transformers (Cu - three phase)	AC3XX-XXXXX/HTXXXX1	14.0	21.0	28.0	325		Extrap.
	…	…	…	…	…		Extrap.
	AE374-N0227	21.0	36.5	40.5	1,086	UUT 4: Hybrid Cu/Al	4
	…	…	…	…	…		Interp.
	AC3XX-XXXXX/HTXXXX1	32.0	50.5	66.0	3,957		Interp.
	AE378-U0376	32.0	50.5	66.0	3,957	UUT 5: Hybrid Cu/Al	5

[1]"H" model numbering applies up to 600V class only and has identical construction to "A" models.
[2] Maximum operating weight and maximum allowed per enclosure depth dimensions.

SPECIAL SEISMIC CERTIFICATION
MODEL LINE NUMBERING - REFERENCE ONLY

2200378-CR-001-R0

Manufacturer:	MGM Transformer Company	**TABLE 3**
Model Line:	General Purpose & Unit Substation Transformers	

Column	Description	Key
Column 1	Prefix	A = This column is always letter "A"
Column 2	Winding Material	C = Copper
		D = Aluminum
		E = Aluminum / Copper Hyprid
Column 3	Phase	2 - Single Phase
		3 - Three Phase
Column 4 & 5	Voltage Class	70 = 600V Class
		72 = 2.5kV Class
		74 = 5kV Class
		76 8.7kV Class
		78 = 15lV Class
		79 = 25kV Class
		81 = 35kV Class
Column 6	Max kVA Rating	A = 9 - 14
		B = 15 - 19
		C = 20 - 24
		D = 25 - 29
		E = 30 - 36
		F = 37 - 44
		G = 45 - 49
		H = 50 - 74
		J = 75 - 99
		K = 100 - 111
		L = 112.5 -124
		M = 125 - 149
		N = 150 -199
		P = 200 - 224
		Q = 225 - 249
		R = 250 - 299
		S = 300 - 399
		T = 400 -499
		U = 500 - 749
		V = 750 - 999
		W = 1,000 - 1,499
		X = 1,500 - 1,999
		Y = 2,000 - 2,499
		Z = 2,500 and up
Columns 7-10	Unit Specific Digits	Details specific primary and secondary voltage / temp rise. No mechanical change.

SPECIAL SEISMIC CERTIFICATION
ALTERNATE NUMBERING - REFERENCE ONLY

2200378-CR-001-R0

Manufacturer:	MGM Transformer Company	**TABLE 4**
Model Line:	General Purpose & Unit Substation Transformers	

Column	Description	Key		
Column 1	Prefix	H = 220° C Insulation system		
Column 2	Phase	T = Three phase		
		S = Single phase		
Column 3	kVA Rating	9 to 1500		
Column 4 & 6	Primary Voltage or Secondary Voltage	Letter	3-Phase Voltage	1-Phase Voltage
		A	480 Delta	480
		B	208Y/120	120/240
		C	240 Delta	240/480
		D	480Y/277	240
		E	120 Delta	120
		F	600 Delta	600
		G	208 Delta	208
		H	230 Delta	230/460
		J	460 Delta	460
		K	240/120 CT	
		L	240Y/139	
		M	380 Delta	
		N	575 Delta	
		P	230Y/133	230/115
		Q	400Y/231	
		R	380Y/220	
		T	240Y/139	
		U	440D	
		V	220D	110/220
		W	500D	230
		X	440Y/254	
		AZ	450D	450
		BZ	440Y/254	440
		CZ	415D	
		DZ	240 X 480	
		EZ	220Y/127	
		FZ	416Y/240	
		GZ	560Y/266	
		HZ	115D	115
		JZ	550D	
		KZ	280D	
		LZ	360D	
		MZ	160Y/93	

SPECIAL SEISMIC CERTIFICATION
ALTERNATE NUMBERING - REFERENCE ONLY

2200378-CR-001-R0

Manufacturer:	MGM Transformer Company	**TABLE 4**
Model Line:	General Purpose & Unit Substation Transformers	

Column	Description	Key		
Column 4 & 6	Primary Voltage or Secondary Voltage	NZ	130Y/75	
		PZ	240Y X 208Y	
		RZ	208D X 230D	
		SZ	277Y/160	
		TZ	490D	
Column 5	Taps	1 through 8		
Column 7	Conductor Material	1 = Cu		
		2 = Al		
		3 = Al/Cu		

SPECIAL SEISMIC CERTIFICATION
CERTIFIED SUBCOMPONENT MATRIX

2200378-CR-001-R0

Manufacturer: MGM Transformer Company
Model Line: General Purpose & Unit Substation Transformers
Table Description: Enclosures

TABLE 5

Building Code: CBC 2019
Seismic Certification Limits: S_{DS} = 2.0 g z/h = 1.0; S_{DS} = 2.0 g z/h = 0.0; I_P = 1.5

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
General Purpose (MGM)	GPA	14	21	28	60	Carbon steel		4
	GPB	17	26.5	32	90	Carbon steel		Interp.
	GPB+	20	28.5	38.5	115	Carbon steel		Interp.
	GPC	21.8	31.5	40.5	125	Carbon steel		Interp.
	GPC+	21.8	36.5	40.5	135	Carbon steel		Interp.
	GPD	26.5	40.5	51.5	345	Carbon steel		Interp.
	GPE	32	50.5	66	535	Carbon steel		5
Unit Substation (MGM)	US56	50	56	90	1100	Carbon steel		Interp.
	US64	50	64	90	1200	Carbon steel		3
	US72	50	72	90	1300	Carbon steel		Interp.
	US80	50	80	90	1460	Carbon steel		Interp.
	US90	50	90	90	1630	Carbon steel		Interp.
	US90L	60	90	100	1780	Carbon steel		Interp.
	US90K	60	90	90	1640	Carbon steel		Interp.
	US90M	50	90	100	1710	Carbon steel		Interp.
	US100	60	100	100	2070	Carbon steel		Interp.
	US108	60	108	108	2330	Carbon steel		6
	US100M	60	100	108	2150	Carbon steel	1" Max difference in C.G. from US108	Extrap.
	US108L	60	108	108	2330	Carbon steel	1" Max difference in C.G. from US108	Extrap.

UNIT UNDER TEST (UUT) SUMMARY SHEET

2200378-CR-001-R0

Manufacturer: MGM Transformer Company

Model Line: General Purpose & Unit Substation Transformers

UUT	Unit Description	Report Number	Testing Lab	Year Tested	ISO 17025 Accredited?	S_{DS}	z/h	I_P
3	Unit Substation 225kVA Al, Three Phase	T5138	Clark Testing	2010	Yes	2.0 2.0	1.0 0.0	1.5
4	General Purpose Transformer 15kVA Al/Cu, Single Phase	1700707-TR-001 R3	Pacific Earthquale Engineering Research Center (PEER)	2018	Yes	2.12 2.75	1.0 0.0	1.5
5	General Purpose Transformer 500kVA Al/Cu, Three Phase	1700707-TR-001 R3	Pacific Earthquale Engineering Research Center (PEER)	2018	Yes	2.12 2.75	1.0 0.0	1.5
6	Unit Substation 3000kVA Al/Cu, Three Phase	1700707-TR-001 R3	Pacific Earthquale Engineering Research Center (PEER)	2018	Yes	2.12 2.75	1.0 0.0	1.5

Notes:

UNIT UNDER TEST (UUT) SUMMARY SHEET

2200378-CR-001-R0

UUT 3

Manufacturer: MGM Transformer Company
Model Line: General Purpose & Unit Substation Transformers
Model Number: AD374-Q0224 ***Serial Number:*** N/A

Product Construction Summary:
NEMA 3R.
Carbon Steel Enclosure.
Open Wound Coil Construction.

Options/Subcomponent Summary:
225 kVA. 5kV class. Aluminum windings. 3 phase. US64 Enclosure.

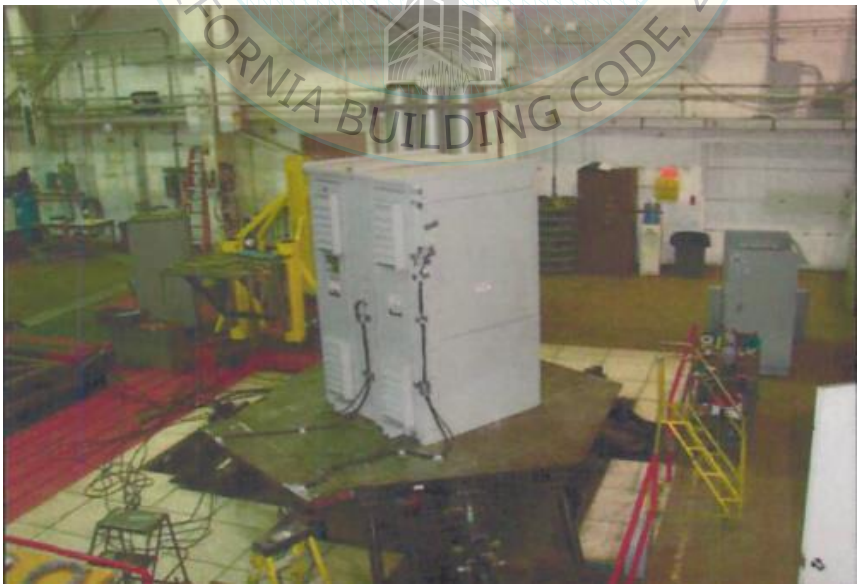
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
2,500	50.0	64.0	90.0	12.7	14.2	19.1

UUT Highest Passed Seismic Run Information

Building Code	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	2.0	1.0	1.5	3.20	2.40	1.33	0.53
		2.0	0.0					

Test Mounting Details:



Unit was rigid floor mounted using four (4) 5/8" Grade 5 bolts with washers and lock washers.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

2200378-CR-001-R0

UUT 4

Manufacturer: MGM Transformer Company
Model Line: General Purpose & Unit Substation Transformers
Model Number: AE374-N0227 ***Serial Number:*** N/A

Product Construction Summary:
NEMA 3R.
Carbon Steel Enclosure.
Open Wound Coil Construction.

Options/Subcomponent Summary:
150 kVA. 5kV class. Aluminum and Copper windings. 3 phase. GPA Enclosure.

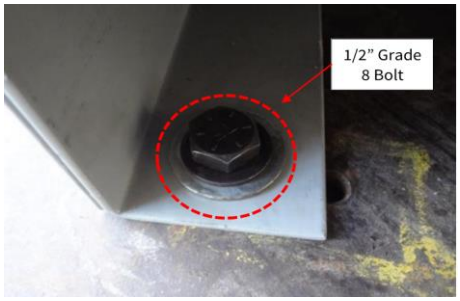
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1,086	21.0	36.5	40.5	10.85	5.31	10.96

UUT Highest Passed Seismic Run Information

Building Code	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	2.12	1.0	1.5	3.39	2.54	1.83	0.73
		2.75	0.0					

Test Mounting Details:



Base mounted-rigid using four (4) 1/2" -13 SAE Grade 8 bolts with lock washers and flat washers.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

2200378-CR-001-R0

UUT 5

Manufacturer: MGM Transformer Company
Model Line: General Purpose & Unit Substation Transformers
Model Number: AE378-U0376 ***Serial Number:*** N/A

Product Construction Summary:
NEMA 3R.
Carbon Steel Enclosure.
Open Wound Coil Construction.

Options/Subcomponent Summary:
500 kVA. 5kV class. Aluminum and Copper windings. 3 phase. GPE Enclosure.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
3,957	32.0	50.5	66.0	8.25	6.85	16.42

UUT Highest Passed Seismic Run Information

Building Code	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	2.12	1.0	1.5	3.39	2.54	1.83	0.73
		2.75	0.0					

Test Mounting Details:

Base mounted-rigid using four (4) 1/2" -13 SAE Grade 8 bolts with lock washers and flat washers.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

2200378-CR-001-R0

UUT 6

Manufacturer: MGM Transformer Company
Model Line: General Purpose & Unit Substation Transformers
Model Number: AE381-Z0107 ***Serial Number:*** N/A

Product Construction Summary:
NEMA 3R.
Carbon Steel Enclosure.
Open Wound Coil Construction.

Options/Subcomponent Summary:
3000 kVA. 35kV class. Aluminum and Copper windings. 3 phase. US108 Enclosure.

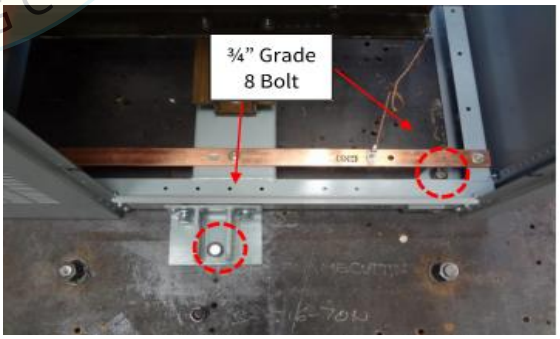
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
20,502	60.0	108.0	108.0	15.78	20.00	15.14

UUT Highest Passed Seismic Run Information

Building Code	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	2.12	1.0	1.5	3.39	2.54	1.83	0.73
		2.75	0.0					

Test Mounting Details:



Base mounted-rigid using four (4) 3/4" -10 SAE Grade 8 bolts with lock washer and flat washer internally at units corners and four (4) 3/4"-10 SAE Grade 8 bolts with lock washer and flat washer on the exterior of the unit through the down-turned manufacturer provided lifting lugs.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
Contents were included in testing per operating conditions.