APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP – 0056-10

OSHPD 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: MGM General Purpose & Unit Substation Transformers

Product Type: Dry-Type Transformer

Product Model Number: General Purpose & Unit Substation Transformers
(List all unique product identification numbers and/or part numbers)

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

Mounting Description: Base Mounted – Rigid

Applicant Information

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

Contact Person: Andrew M. Coughlin, SE

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

Telephone: 844-878-0200 Email: acoughlin@structint.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: Andrew M Coughlin Date: 5/16/18

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

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

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

Name: Andrew M. Coughlin California License Number: S6082

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

Telephone: 844-878-0200 Email: acoughlin@structint.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

Company Name: Clark Testing

Contact Name: Patrick Wetherill

Mailing Address: 1801 Route 51 South, Building 8, Jefferson Hills, PA 15025

Telephone: 412-387-1001 Email: pwetherill@clarktesting.com

Company Name: Pacific Earthquake Engineering Research Center (PEER)

Contact Name: Amarnath Kasalanati

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

Telephone: 510-642-3437 Email: Peer_center@berkeley.edu

Seismic Parameters

Design in accordance with ASCE 7-10 Chapter 13: ☒ Yes ☐ No

Design Basis of Equipment or Components (F_p/W_p) = 1.44 (S_{DS} = 2.00, z/h = 1.0); 0.90(S_{DS} = 2.00, z/h = 0.0)

S_{DS} (Design spectral response acceleration at short period, g) = 2.00

a_p (In-structure equipment or component amplification factor) = 1.0

R_p (Equipment or component response modification factor) = 2.5

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 7-10 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): Attachment A

OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2022

Signature: Sonia Eliseo Date: August 20, 2019

Print Name: Sonia Eliseo Title: SSE

Special Seismic Certification Valid Up to : S_{DS} (g) = 2.00 z/h = 1.0

Condition of Approval (if applicable): _____

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 1700707

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 On Line 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 2016 ***Seismic Certification Limits:*** S_{DS} = 2.00 g z/h=1.0 I_P = 1.5

Model Line	Model[1]	Dimensions (in)			Weight[2] (lb)	Notes	UUT
		Depth	Width	Height			
Unit Substation Transformers (Al - single phase)	AD2XX-XXXXX/HSXXXX2	50	56	90	1970		Extrap
	...	...					Extrap
	AD2XX-XXXXX/HSXXXX2	50	64	90	2250		Extrap
Unit Substation Transformers (Cu - single phase)	AC2XX-XXXXX/HSXXXX1	50	56	90	1970		Extrap
	...	...					Extrap
	AC2XX-XXXXX/HSXXXX1	50	90	100	3165		Extrap
	AC2XX-XXXXX/HSXXXX1	60	90	90	3800		Extrap
	...	...					Extrap
	AC2XX-XXXXX/HSXXXX1	60	108	100	20502		Extrap
Unit Substation Transformers (Al - three phase)	AD3XX-XXXXX/HTXXXX2	50	56	90	1970		Extrap
	...	...					Extrap
	AD374-Q0224	50	64	90	2500		3
	…	...					Interp.
	AD3XX-XXXXX/HTXXXX2	50	90	100	3516		Interp.
	AD3XX-XXXXX/HTXXXX2	60	90	90	4219		Interp.
	…	...					Interp.
	AD3XX-XXXXX/HTXXXX2	60	108	108	20502		Interp.
	AE381-Z0107	60	108	108	20502	UUT6: Hybrid Cu/Al	6
Unit Substation Transformers (Cu - three phase)	AC3XX-XXXXX/HTXXXX1	60	56	90	2625		Interp.
	...	...					Interp.
	AC3XX-XXXXX/HTXXXX1	60	108	108	20502		Interp.
	AE381-Z0107	60	108	108	20502	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 dimension.

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 1700707

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 On Line 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 2016 ***Seismic Certification Limits:*** S_{DS} = 2.00 g z/h=1.0 I_P = 1.5

Model Line	Model[1]	Dimensions (in)			Weight[2] (lb)	Notes	UUT
		Depth	Width	Height			
General Purpose Transformers (Al - single phase)	AD2XX-XXXXX/HSXXXX2	14	21	28	295		Extrap.
	...	...					Extrap.
	AD2XX-XXXXX/HSXXXX2	32	50.5	66	3560		Extrap.
General Purpose Transformers (Cu - single phase)	AC2XX-XXXXX/HSXXXX1	14	21	28	295		Extrap.
	...	...					Extrap.
	AC2XX-XXXXX/HSXXXX1	32	50.5	66	3560		Extrap.
General Purpose Transformers (Al - three phase)	AD3XX-XXXXX/HTXXXX2	14	21	28	325		Extrap.
	...	...					Extrap.
	AE374-N0227	21	36.5	40.5	1,086	UUT 4: Hybrid Cu/Al	4
	...	...					Interp.
	AD3XX-XXXXX/HTXXXX2	32	50.5	66	3957		Interp.
	AE378-U0376	32	50.5	66	3957	UUT 5: Hybrid Cu/Al	5
General Purpose Transformers (Cu - three phase)	AC3XX-XXXXX/HTXXXX1	14	21	28	325		Extrap.
	...	...					Extrap.
	AE374-N0227	21	36.5	40.5	1,086	UUT 4: Hybrid Cu/Al	4
	...	...					Interp.
	AC3XX-XXXXX/HTXXXX1	32	50.5	66	3957		Interp.
	AE378-U0376	32	50.5	66	3957	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 dimension.

SPECIAL SEISMIC CERTIFICATION
MODEL LINE NUMBERING - FOR REFERENCE ONLY

TRU PROJECT NO. 1700707

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

Column 1	Prefix	A = This column is always letter "A"
Column 2	Winding material	C = Copper
		D = Aluminum
		E = Aluminum/Copper Hybrid
Column 3	Phase	2 = Single Phase
		3 = Three Phase
Columns 4 & 5	Voltage Class	70 = 600 V Class
		72 = 2.5 kV Class
		74 = 5 kV Class
		76 = 8.7 kV Class
		78 = 15kV Class
		79 = 25 kV Class
		81 = 35 kV 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 - FOR REFERENCE ONLY

TRU PROJECT NO. 1700707

TRU COMPLIANCE

Manufacturer:	MGM Transformer Company	**TABLE 4**
Model Line:	General Purpose & Unit Substation Transformers (1.2kV Class only)	

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	
		NZ	130Y/75	

SPECIAL SEISMIC CERTIFICATION
ALTERNATE NUMBERING - FOR REFERENCE ONLY

TRU PROJECT NO. 1700707

Manufacturer: MGM Transformer Company ***Model Line:*** General Purpose & Unit Substation Transformers (1.2kV Class only)				**TABLE 4**
Column 4 & 6	Primary Voltage or Secondary Voltage	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

TRU PROJECT NO. 1700707

TRU COMPLIANCE

Manufacturer: MGM Transformer Company ***Table Description:*** Enclosures

Model Line: General Purpose & Unit Substation Transformers

TABLE 5

Building Code: CBC 2016 ***Seismic Certification Limits:*** S_{DS} = 2.00 g z/h = 1.0 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

TRU PROJECT NO. 1700707

Manufacturer: MGM Transformer Company

Model Line: General Purpose & Unit Substation Transformers

UUT	Unit Description	Report Number	Testing Laboratory	S_{DS}	z/h	I_P
3	Unit Substation 225kVA Al, Three Phase	T5138	Clark Testing	2.00	1	1.5
4	General Purpose Transformer 15kVA Al/Cu, Single Phase	1700707-TR-001 R2	PEER	2.12	1	1.5
5	General Purpose Transformer 500kVA Al/Cu, Three Phase	1700707-TR-001 R2	PEER	2.12	1	1.5
6	Unit Substation 3000kVA Al/Cu, Three Phase	1700707-TR-001 R2	PEER	2.12	1	1.5

Notes:

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 1700707

UUT 3

Manufacturer: MGM Transformer Company
Model Line: 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	64	90	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 2016	ICC-ES AC156	2.00	1.0	1.5	3.2	2.4	1.33	0.53

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.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 1700707

UUT 4

Manufacturer: MGM Transformer Company
Model Line: General Purpose 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. Three Phase, Aluminum and Copper windings. GPA Enclosure

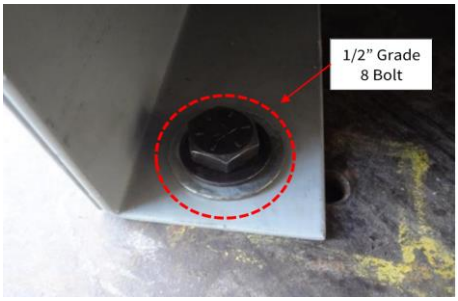
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1,086	21	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 2016	ICC-ES AC156	2.12	1.0	1.5	3.39	2.54	1.42	0.56
		2.75	0.0	1.5	2.75	1.1	1.83	0.73

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.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 1700707

UUT 5

Manufacturer: MGM Transformer Company
Model Line: General Purpose 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. 15kV 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	50.5	66	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 2016	ICC-ES AC156	2.12	1.0	1.5	3.39	2.54	1.42	0.56
		2.75	0.0	1.5	2.75	1.1	1.83	0.73

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.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 1700707

UUT 6

Manufacturer: MGM Transformer Company
Model Line: 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

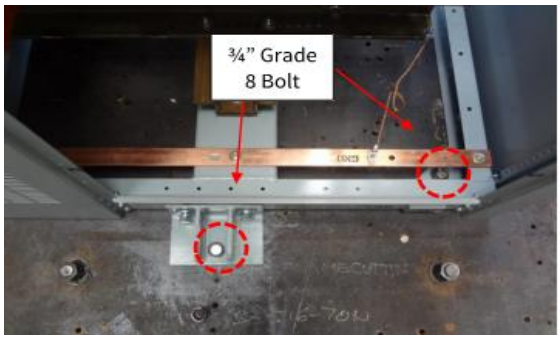
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
20, 502	60	108	108	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 2016	ICC-ES AC156	2.12	1.0	1.5	3.39	2.54	1.42	0.56
		2.75	0.0	1.5	2.75	1.1	1.83	0.73

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.
Contents were included in testing per operating conditions.