APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP – 0136

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Hammond Power Solutions, Inc.

Manufacturer's Technical Representative: Watson Wong

Mailing Address: 595 Southgate Drive, Guelph, Ontario, Canada N1G 3W6

Telephone: (519) 822-2441 Email: wwong@hammondpowersolutions.com

Product Information

Product Name: Transformer Product Families

Product Type: Dry-Type Transformer

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

General Description: Product lines include a range of kVA ratings from 0.025 kVA – 3,750 kVA. 1-3 Phase Transformers. Seismic enhancements made to the test units and modifications required to address the anomalies observed during the tests shall be incorporated into the production units.

Mounting Description: Varies (See Attachment)

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: 844-878-0200 Email: greid@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: Date: 2/20/2019

Title: Program Manager 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: Structural and Earthquake Engineering and Simulation Laboratory (SEESL)

Contact Name: Mark Pitman

Mailing Address: 212 Ketter Hall, North Campus

Telephone: (716) 645-4377 Email: mpitman@buffalo.edu

Company Name: Environmental Testing Laboratory

Contact Name: Jeremy Lange

Mailing Address: 11034 Indian Trail, Dallas, TX 75229

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

Company Name: Clark Testing

Contact Name: Devon Lohr

Mailing Address: 1801 Route 51

Telephone: (412) 387-1026 Email: dlohr@clarktesting.com

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 (z/h = 1); 0.90 (z/h = 0)

S_{DS} (Design spectral response acceleration at short period, g) = 2.00 (z/h = 1); 2.00 (z/h = 0)

a_p (In-structure equipment or component amplification factor) = 1

R_p (Equipment or component response modification factor) = 2.5

Ω_0 (System overstrength factor) = 2

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = 1 (S_{DS} = 2.00); 0 (S_{DS} = 2.00)

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

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

Signature: _____ Date: April 13, 2020

Print Name: Timothy J. Piland Title: SSE

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

Condition of Approval (if applicable):

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 1800840

TRU COMPLIANCE

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type E Transformers

TABLE 1

Certified Product Construction Summary:
NEMA 1 ventilated carbon steel enclosure.

Certified Options Summary:
1 Phase. General purpose enclosed transformer (FusionTM). Octogonal wound core (OWC) copper windings.
Transformer brand name options: Hammond Power Solutions, Inc., Eaton, Square-D Company/Schneider Electric, Siemens Energy and Automation, GE. OSHPD OSP labels are applied by Hammond Power Solutions at the factory and designate units built under this approval.

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*** I_P= ***1.5***

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
HPS Fusion™ (FS Model: 1PH)	0.025 kVA	5.9	2.7	3.3	3.0		1
	0.05 kVA	6.1	2.9	3.5	3.4		Interp.
	0.10 kVA	6.3	3.1	3.6	3.9		Interp.
	0.15 kVA	6.9	3.1	3.6	5.2		Interp.
	0.25 kVA	6.6	3.9	4.3	7.7		Interp.
	0.35 kVA	7.2	3.9	4.3	9.4		Interp.
	0.50 kVA	7.2	4.6	4.6	13.0		Interp.
	0.75 kVA	7.2	5.6	5.1	18.0		Interp.
	1.0 kVA	8.0	5.6	5.1	23.0		Interp.
	1.5 kVA	8.5	6.6	6.0	31.0		Interp.
	2.0 kVA	9.1	6.6	6.0	38.0		Interp.
	3.0 kVA	11.7	7.8	6.7	69.0		Interp.
	5.0 kVA	13.4	8.0	7.1	91.0		Interp.
	7.5 kVA	15.1	9.3	8.0	104.0		2

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 1800840

TRU COMPLIANCE

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type F and K Transformers (VPI Construction)

TABLE 2.1

Certified Product Construction Summary:
NEMA 3R ventilated carbon steel enclosure. PEM nuts not required below 45kVA.

Certified Options Summary:
NMF: 1 Phase. NMK: 3 Phase. MV1S: 1PH. MV3S: 3 Phase. Energy efficient general purpose (SentinelTM). General purpose medium voltage distribution (MilleniumTM). Vacuum Pressure Impregnated (VPI). Copper and aluminum windings. 600V Class - 34.5 kV Class. Transformer brand name options: Hammond Power Solutions, Inc., Eaton, Square-D Company/Schneider Electric, Siemens Energy and Automation, GE. OSHPD OSP labels are applied by Hammond Power Solutions at the factory and designate units built under this approval.

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*** I_P= ***1.5***

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
HPS Sentinel™ (NMF & NMK) HPS Millenium™ (MV1S & MV3S)	15 kVA	20.1	21.5	22.0	160	*UUT: 3PH, Al windings*	17
	15 kVA	20.2	19.4	21.5	185	*UUT: 1PH, Al windings*	5
	25 kVA	25.8	23.8	28.8	220		Interp.
	30 kVA	25.8	23.8	28.8	445		Interp.
	45 kVA	25.8	23.8	28.8	430	*UUT20/23: 3PH, Al & Cu windings*	20, 23
	50 kVA	25.0	26.0	38.0	370		Interp.
	75 kVA	29.5	32.0	41.0	830		Interp.
	100 kVA	29.5	32.0	41.0	650		Interp.
	112.5 kVA	29.5	32.0	41.0	1,100		Interp.
	150 kVA	34.0	39.5	51.5	1,500		Interp.
	167 kVA	32.5	32.0	50.0	900		Interp.
	225 kVA	34.0	39.5	51.5	1,600		Interp.
	300 kVA	34.0	39.5	51.5	1,900		Interp.
	500 kVA	38.4	48.5	59.0	2,900		Interp.
	750 kVA	43.4	51.5	66.0	4,150		Interp.
	1,000 kVA	44.4	64.0	71.0	5,450		Interp.
	1,250 kVA	44.4	64.0	71.0	6,150		Interp.
	1,500 kVA	51.4	64.0	75.0	6,600	*UUT: 3PH, Cu windings*	6
*Type F and K (Custom Voltage)	15 kVA	20.2	19.4	21.5	185		Interp.
	...	..	...	...	...		Interp.
	300 kVA	76.0	50.0	74.1	3,870	*UUT: 3PH, Al & Cu windings*	9
	...	...	...	...	...		Interp.
	3,750 kVA	125.0	72.0	111	16,595	*UUT: 3PH, Al & Cu windings*	10

****Type F and K are similar to Sentinel and Millenium but allow for possible custom kVA ratings***

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 1800840

TRU COMPLIANCE

Manufacturer:	Hammond Power Solutions, Inc.	**TABLE 2.2**
Model Line:	Type F and K Transformers (VPI Construction)	

Certified Product Construction Summary:

NEMA 3R ventilated carbon steel enclosure.

Certified Options Summary:

NMK: 3 Phase. Energy efficient general purpose (SentinelTM). Vacuum Pressure Impregnated (VPI). Copper and aluminum windings. 600V Class - 34.5 kV Class.

Transformer brand name options: Hammond Power Solutions, Inc., Eaton, Square-D Company/Schneider Electric, Siemens Energy and Automation, GE. OSHPD OSP labels are applied by Hammond Power Solutions at the factory and designate units built under this approval.

Mounting Configuration:

Wall 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*** I_P= ***1.5***

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
HPS Sentinel™ (NMK)	15 kVA	21.5	20.1	22.0	160	*UUT: 3PH, Al windings*	19
	25 kVA	25.8	23.8	28.8	220		Interp.
	30 kVA	25.8	23.8	28.8	370		Interp.
	45 kVA	25.8	23.8	28.8	430	*UUT: 3PH, Al & Cu windings*	18

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 1800840

TRU COMPLIANCE

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type CF and CK (Cast Resin Construction)

TABLE 3

Certified Product Construction Summary:
NEMA 3R carbon steel enclosure.

Certified Options Summary:
3 Phase Cast Resin construction with inner and outer winding. Reactor (R) construction has an inner winding only. Inner and outer windings are Copper and/or Aluminum. Inside low voltage coil: Cast Resin or VPI construction. 5kV to 34.5kV Class. With or without coordinated bus and enclosure. Transformer brand name options: Hammond Power Solutions, Inc., Eaton, Square-D Company/Schneider Electric, Siemens Energy and Automation, GE. OSHPD OSP labels are applied by Hammond Power Solutions at the factory and designate units built under this approval.

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*** I_P= ***1.5***

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
HPS EnduraCoil™ Cast Transformer: CF, CK Cast Reactor: CFR, CFK	300 kVA	50	76	74.1	3,870	*UUT: Al & Cu windings*	9
		54	90	91.5	3,750		Interp.
		60	90	91.5	4,150		Interp.
	500 kVA	54	70	91.5	4,600		Interp.
		54	90	91.5	4,900		Interp.
		60	90	91.5	5,400		Interp.
	750 kVA	54	70	91.5	5,600		Interp.
		54	90	91.5	6,000		Interp.
		60	105	91.5	6,600		Interp.
	1,000 kVA	60	90	91.5	6,700		Interp.
		60	90	91.5	7,200		Interp.
		60	105	91.5	7,900		Interp.
	1,500 kVA	60	90	91.5	9,400		Interp.
		60	90	91.5	10,100		Interp.
		72	105	91.5	11,100		Interp.
	2,000 kVA	60	105	91.5	11,900		Interp.
		60	105	91.5	12,700		Interp.
		72	110	91.5	14,000		Interp.
	2,500 kVA	60	105	110	13,100		Interp.
		60	105	110	14,000		Interp.
		72	105	110	15,400		Interp.
	3,000 kVA	60	105	110	13,750		Interp.
		60	110	110	14,700		Interp.
		72	110	110	16,200		Interp.

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 1800840

TRU COMPLIANCE

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type CF and CK (Cast Resin Construction)

TABLE 3

Certified Product Construction Summary:
NEMA 3R carbon steel enclosure.

Certified Options Summary:
3 Phase Cast Resin construction with inner and outer winding. Reactor (R) construction has an inner winding only. Inner and outer windings are Copper and/or Aluminum. Inside low voltage coil: Cast Resin or VPI construction. 5kV to 34.5kV Class. With or without coordinated bus and enclosure. Transformer brand name options: Hammond Power Solutions, Inc., Eaton, Square-D Company/Schneider Electric, Siemens Energy and Automation, GE. OSHPD OSP labels are applied by Hammond Power Solutions at the factory and designate units built under this approval.

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*** I_P= ***1.5***

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
HPS EnduraCoil™ Cast Transformer: CF, CK Cast Reactor: CFR, CFK	3,500 kVA	60	110	110	14,700		Interp.
		72	110	110	15,700		Interp.
		72	125	110	17,300		Interp.
	3,750 kVA	60	110	110	14,400		Interp.
		72	110	110	15,400		Interp.
		72	125	111	16,595	*UUT: Al & Cu windings*	10
HPS EnduraCoil™ Cast Transformer: CF, CK Cast Reactor: CFR, CFK (Custom Voltage)	112.5 kVA	34	40	52	2,000		Extrap.
	…	…	…	…	…		Extrap.
	300 kVA	64	50	71	3,500		Extrap.
	…	…	…	…	…		Extrap.
	300 kVA	50	76	74.1	3,870	*UUT: Al & Cu windings*	9
	…	…	…	…	…		Interp.
	3,750 kVA	72	125	111	16,595	*UUT: Al & Cu windings*	10

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 1800840

TRU COMPLIANCE

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type PH and 3AH Transformers

TABLE 4

Certified Product Construction Summary:
Non-enclosed. Copper winding. 1 Phase

Certified Options Summary:
Open style core and coil (SpantanTM) with Octogonal wound core (OWC) winding construction. Machine tool industrial control transformer (ImperatorTM) with enclosed OWC construction.
Transformer brand name options: Hammond Power Solutions, Inc., Eaton, Square-D Company/Schneider Electric, Siemens Energy and Automation, GE. OSHPD OSP labels are applied by Hammond Power Solutions at the factory and designate units built under this approval.

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*** I_P= ***1.5***

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
HPS Spartan™ (SP Models) HPS Imperator™ (PH Models)	0.025 kVA	3.0	4.4	3.2	3.5		3
	0.05 kVA	3.0	4.1	3.3	3.5		Interp.
	0.075 kVA	3.3	3.9	3.6	3.5		Interp.
	0.1 kVA	3.3	4.2	3.6	4.5		Interp.
	0.15 kVA	4.0	4.9	3.8	5.7		Interp.
	0.25 kVA	4.5	5.4	3.8	7.5		Interp.
	0.35 kVA	4.5	5.2	4.4	10		Interp.
	0.5 kVA	4.8	5.9	4.3	14		Interp.
	0.75 kVA	4.1	6.7	4.3	17		Interp.
	1 kVA	5.3	6.8	4.9	24		Interp.
	1.5 kVA	5.3	8.2	4.9	32		Interp.
	2 kVA	6.4	5.9	5.3	35		Interp.
	3 kVA	7.5	7.5	6.5	64		Interp.
	5 kVA	8.3	8.8	7.1	97		Interp.
	7.5 kVA	9.0	9.9	7.8	97		4

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 1800840

TRU COMPLIANCE

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type Q and QT Transformers

TABLE 5

Certified Product Construction Summary:
NEMA 3R, NEMA 4 or NEMA 12 non-ventilated carbon steel enclosure. Copper winding.

Certified Options Summary:
1 and 3 Phase. Industrial encapsulated winding construction (TitanTM)
HPS Universal is identical in construction to Titan, but only available up to 5 kVA
Transformer brand name options: Hammond Power Solutions, Inc., Eaton, Square-D Company/Schneider Electric, Siemens Energy and Automation, GE. OSHPD OSP labels are applied by Hammond Power Solutions at the factory and designate units built under this approval

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*** I_P= ***1.5***

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
HPS Titan™ HPS Universal™ (Q models: 1PH) (P models: 3PH)	0.05 kVA	5.3	3.8	7.3	6	*UUT: 1PH, Cu windings*	7
	...	...	...	...	...		Interp.
	0.5 kVA	4.8	5	9.3	15		Interp.
	0.75 kVA	4.8	5	9.3	18		Interp.
	1 kVA	5.5	5.9	10	22		Interp.
	1.5 kVA	5.5	5.9	10	25		Interp.
	2 kVA	6.5	12.4	11.3	49		Interp.
	3 kVA	6.5	12.4	11.3	68		Interp.
	5 kVA	7.8	10	17.3	90		Interp.
	6 kVA	6.9	15.2	15.1	146		Interp.
	7.5 kVA	7.8	10	17.3	115		Interp.
	9 kVA	10.3	16.6	16.6	211		Interp.
	10 kVA	9.3	12.3	20.9	165		Interp.
	15 kVA	10.4	19.3	16.6	270		Interp.
	30 kVA	13	20.3	23.4	555		Interp.
	45 kVA	13	22.3	28.4	765		Interp.
	75 kVA	16	31.3	29.9	1,600		Interp.
	112.5 kVA	26	38.5	39.1	2,100		Interp.
	150 kVA	26	38.5	39.1	2,450	*UUT: 3PH, Cu windings*	8

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 1800840

TRU COMPLIANCE

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Encapsulated Transformers

TABLE 6.1

Certified Product Construction Summary:
NEMA 3R carbon steel enclosure. Copper or Aluminum windings.

Certified Options Summary:
3 Phase. Industrial encapsulated winding construction (TitanTM)
Transformer brand name options: Hammond Power Solutions, Inc., Eaton, Square-D Company/Schneider Electric, Siemens Energy and Automation, GE. OSHPD OSP labels are applied by Hammond Power Solutions at the factory and designate units built under this approval

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*** I_P= ***1.5***

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
HPS Titan N ™ 3 Phase	2 kVA	8.8	12.3	13.2	75	UUT: 3PH, Cu windings	13
	3 kVA	8.8	12.3	13.2	85		Interp.
	6 kVA	9.6	14.8	15.2	152		Interp.
	9 kVA	11.6	17.5	14.4	225		Interp.
	15 kVA	14.0	21.3	17.0	295	UUT: 3PH, Al & Cu windings	12
	30 kVA	17	23.8	21.8	470	UUT: 3PH, Cu windings	15
	45 kVA	18	25.1	21.8	735		Interp.
	75 kVA	20	31.3	25.6	1,445		Interp.
	90 kVA	26	35.1	26.8	1,600	UUT: 3PH, Cu windings	21
	112.5 kVA	26	38.5	39.1	2,100		Interp.
	150 kVA	27	43.0	36.0	3,520	UUT: 3PH, Al & Cu windings	16

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 1800840

TRU COMPLIANCE

Manufacturer: Hammond Power Solutions, Inc. ***Model Line:*** Encapsulated Transformers	**TABLE 6.2**

Certified Product Construction Summary:

NEMA 3R carbon steel enclosure. Copper or Aluminum windings.

Certified Options Summary:

3 Phase. Industrial encapsulated winding construction (TitanTM)

Transformer brand name options: Hammond Power Solutions, Inc., Eaton, Square-D Company/Schneider Electric, Siemens Energy and Automation, GE. OSHPD OSP labels are applied by Hammond Power Solutions at the factory and designate units built under this approval

Mounting Configuration:

Wall 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*** I_P= ***1.5***

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
HPS Titan N ™ 3 Phase	2 kVA	8.8	12.3	13.2	75	UUT: 3PH, Cu windings	11
	3 kVA	8.8	12.3	13.2	85		Interp.
	6 kVA	6.9	15.2	15.1	152		Interp.
	9 kVA	10.3	16.6	16.6	225		Interp.
	15 kVA	14.1	21.3	17.0	295	UUT: 3PH, Al & Cu windings	14
	30 kVA	17	23.8	21.8	470	UUT: 3PH, Cu windings	22B

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 1800840

Manufacturer: Hammond Power Solutions, Inc.

Model Line: Transformer Product Families

UUT	Unit Description	Report Number	Testing Laboratory	S_{DS}	z/h	I_P
1	Type E (Fusion) 0.025 kVA 1 Phase	EL: 9410	Clark Dynamic Test Laboratory, Inc.	2.0	1	1.5
2	Type E (Fusion) 7.5 kVA 1 Phase	EL: 9410	Clark Dynamic Test Laboratory, Inc.	2.0	1	1.5
3	Type PH & 3AH (Spartan) 0.025 kVA 1 Phase	EL: 9405	Clark Dynamic Test Laboratory, Inc.	2.0	1	1.5
4	Type PH & 3AH (Imperator) 7.5 kVA 1 Phase	EL: 9405	Clark Dynamic Test Laboratory, Inc.	2.0	1	1.5
5	Type F & K (Sentinel) 15 kVA 1 Phase	EL: 9504	Clark Dynamic Test Laboratory, Inc.	2.0	1	1.5
6	Type F & K (Millenium) 1,500 kVA 3 Phase	EL: 9504	Clark Dynamic Test Laboratory, Inc.	2.0	1	1.5
7	Type Q & QT (Titan) 0.05 kVA 1 Phase	EL: 9411	Clark Dynamic Test Laboratory, Inc.	2.0	1	1.5
8	Type Q & QT (Titan) 150 kVA 3 Phase	EL: 9411	Clark Dynamic Test Laboratory, Inc.	2.0	1	1.5
9	Type F and K (Cast Resin) 300 kVA 3 Phase	13534, Rev.2	Environmental Testing Laboratory, Inc.	2.0	1	1.5
10	Type F and K (Cast Resin) 3,750 kVA 3 Phase	13534, Rev.2	Environmental Testing Laboratory, Inc.	2.0	1	1.5
11	Titan 2kVA DQT1 Wall Mounted	1800840-TR-001 R0	Structural and Earthquake Engineering and Simulation Laboratory (SEESL)	2.0	1	1.5
12	Titan 15kVA DQT4 Base Mounted	1800840-TR-001 R0	Structural and Earthquake Engineering and Simulation Laboratory (SEESL)	2.0	1	1.5
13	Titan 2kVA DQT1 Base Mounted	1800840-TR-001 R0	Structural and Earthquake Engineering and Simulation Laboratory (SEESL)	2.0	1	1.5
14	Titan 15kVA DQT4 Wall Mounted	1800840-TR-001 R0	Structural and Earthquake Engineering and Simulation Laboratory (SEESL)	2.0	1	1.5
15	Titan 30kVA DQT5 Base Mounted	1800840-TR-001 R0	Structural and Earthquake Engineering and Simulation Laboratory (SEESL)	2.0	1	1.5
16	Titan 150kVA DQT10 Base Mounted	1800840-TR-001 R0	Structural and Earthquake Engineering and Simulation Laboratory (SEESL)	2.0	1	1.5

Notes:

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 1800840

Manufacturer: Hammond Power Solutions, Inc.

Model Line: Transformer Product Families

UUT	Unit Description	Report Number	Testing Laboratory	S_{DS}	z/h	I_P
17	Sentinel 15kVA DH1 Base Mounted	1800840-TR-001 R0	Structural and Earthquake Engineering and Simulation Laboratory (SEESL)	2.0	1	1.5
18	Sentinel 45kVA DH2 Wall Mounted	1800840-TR-001 R0	Structural and Earthquake Engineering and Simulation Laboratory (SEESL)	2.0	1	1.5
19	Sentinel 15kVA DH1 Wall Mounted	1800840-TR-001 R0	Structural and Earthquake Engineering and Simulation Laboratory (SEESL)	2.0	1	1.5
20	Sentinel 45kVA DH2 Base Mounted	1800840-TR-001 R0	Structural and Earthquake Engineering and Simulation Laboratory (SEESL)	2.0	1	1.5
21	Titan 90 kVA DQTXX Base Mounted	1800840-TR-001 R0	Structural and Earthquake Engineering and Simulation Laboratory (SEESL)	2.0	1	1.5
22B	Titan 30kVA DQT5 Wall Mounted	1800840-TR-001 R0	Structural and Earthquake Engineering and Simulation Laboratory (SEESL)	2.0	1	1.5
23	Sentinel 45kVA DH2 Base Mounted	1800840-TR-001 R0	Structural and Earthquake Engineering and Simulation Laboratory (SEESL)	2.0	1	1.5

Notes:

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 1800840

UUT 1

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type E (Fusion)
Model Number: FS25MQMJ ***Serial Number:*** N/A

Product Construction Summary:
NEMA 1 Ventilated carbon steel enclosure.

Options/Subcomponent Summary:
0.025kVA. 1 Phase. General purpose enclosed transformer. OWC Copper windings.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
3	5.9	2.7	3.3	21.7	28.0	>33

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

Unit is rigid base mounted to the seismic table using (4) #10-32 screws, 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

TRU PROJECT NO. 1800840

UUT 2

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type E (Fusion)
Model Number: FS7500MQMJ ***Serial Number:*** N/A

Product Construction Summary:
NEMA 1 Ventilated carbon steel enclosure.

Options/Subcomponent Summary:
7.5 kVA. 1 Phase. General purpose enclosed transformer. OWC Copper windings.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
97	8.0	9.3	15.1	18.7	28.0	>33

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

Unit is rigid base mounted to the seismic table using (4) 3/8" Grade 5 bolts.
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

TRU PROJECT NO. 1800840

UUT 3

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type PH & 3AH (Spartan)
Model Number: PH25MQMJ ***Serial Number:*** N/A

Product Construction Summary:
Non-enclosed.

Options/Subcomponent Summary:
0.025 kVA. 1 Phase. Open core & coil style. OWC copper windings.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
3.5	4.0	3.2	4.4	21.4	21.6	>33

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

Unit is rigid base mounted to the seismic table using (4) #10-32 screws, 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

TRU PROJECT NO. 1800840

UUT 4

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type PH & 3AH (Imperator)
Model Number: SP7500MQMJ ***Serial Number:*** N/A

Product Construction Summary:
Non-enclosed.

Options/Subcomponent Summary:
1 Phase. Open core & coil style with molded covers. Enclosed OWC copper windings.

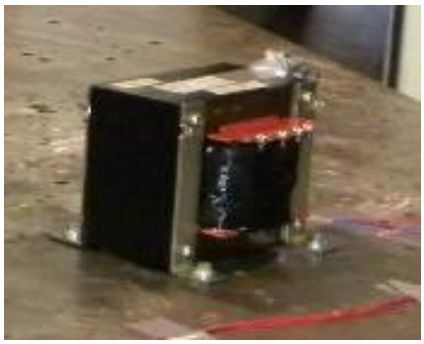
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
104	9.0	9.9	7.8	33.0	22.2	>33

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:



Unit is rigid base mounted to the seismic table using (4) 3/8" 16 hex head bolts.
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

TRU PROJECT NO. 1800840

UUT 5

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type F & K (Sentinel)
Model Number: NFP015LEAH3 ***Serial Number:*** N/A

Product Construction Summary:
NEMA 3R carbon steel enclosure.

Options/Subcomponent Summary:
15 kVA. 1 phase. Energy Efficient General Purpose. Vacuum pressure impregnated (VPI) aluminum windings.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
185	20.2	19.4	21.5	23.4	11.5	23.8

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

Unit is rigid base mounted to the seismic table using (4) 1/2" Grade 5 bolts.
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

TRU PROJECT NO. 1800840

UUT 6

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type F & K (Millenium)
Model Number: MV3S1500SKC ***Serial Number:*** N/A

Product Construction Summary:
NEMA 3R ventilated carbon steel enclosure. Modified I-beam base frame.

Options/Subcomponent Summary:
1,500 kVA. 3 phase. General purpose medium voltage distribution. Vacuum pressure impregnated (VPI) copper windings.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
6,600	51.4	64.0	75.0	13.8	15.4	33.3

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

Seismic modifications required.
See next page for modified base details.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
Contents were included in testing per operating conditions.

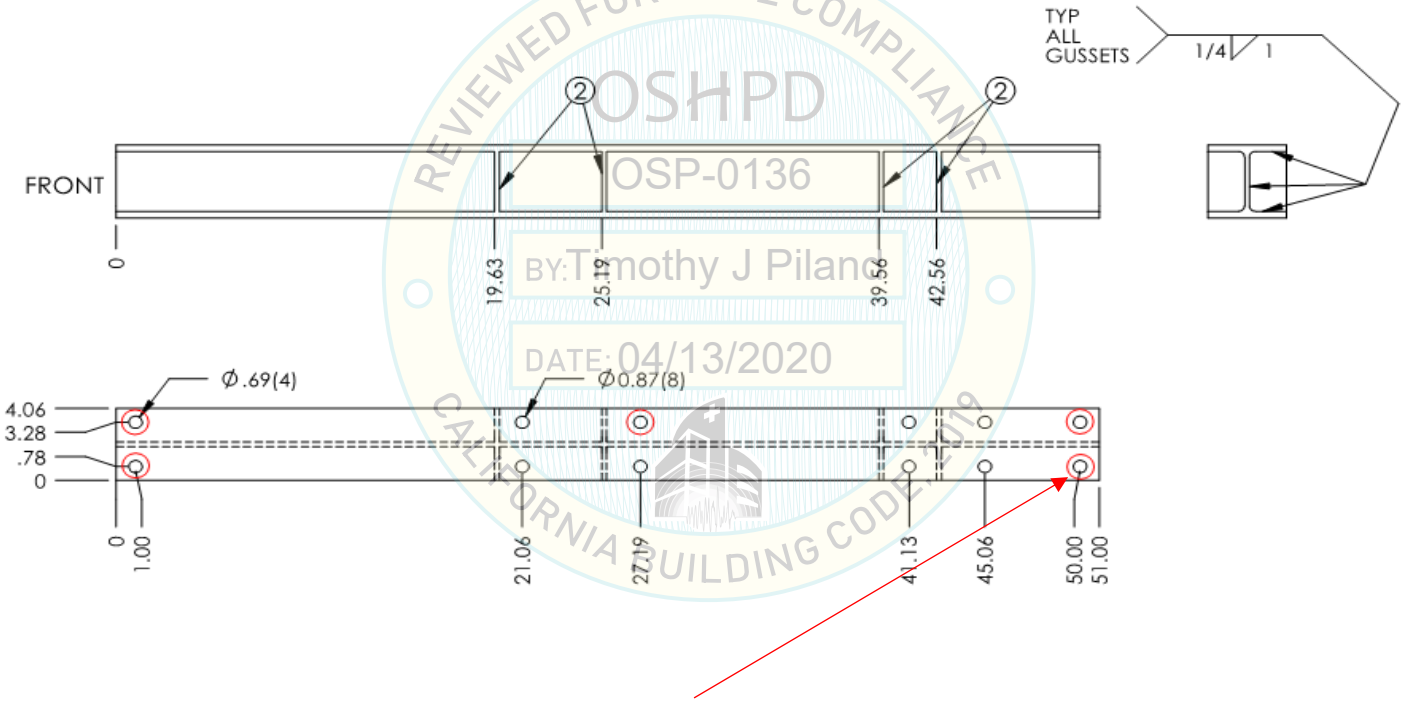
UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 1800840

Manufacturer:	Hammond Power Solutions, Inc.		**UUT 6**
Model Line:	Type F & K (Millenium)		
Model Number:	MV3S1500SKC	***Serial Number:***	N/A

Modified Base Beam Detail:

Part Name	Description	Length	Material	Qty.
I-Beam Base	W4 X 13	51"	ASTM A36	2
I-Beam Gusset	1/4" x 2" Plate	3.38"	ASTM A36	8



5/8"-11 Grade 5 mounting bolts, washers, and lock washers torqued to 150 ft.-lbs. used at locations circled in red.
Bolt layout mirrored on opposite side of transformer.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 1800840

UUT 7

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type Q & QT (Titan)
Model Number: QC05YECB ***Serial Number:*** N/A

Product Construction Summary:
NEMA 3R non-ventilated carbon steel enclosure.

Options/Subcomponent Summary:
0.05 kVA. 1 phase. Industrial Encapsulated. Copper Windings.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
6	7.3	3.8	5.3	18.6	22.2	>33

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

UUT 7

Unit is rigid base mounted to the seismic table using (3) #10-32 screws.
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

TRU PROJECT NO. 1800840

UUT 8

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type Q & QT (Titan)
Model Number: P150KBKF ***Serial Number:*** N/A

Product Construction Summary:
NEMA 3R non-ventilated carbon steel enclosure.

Options/Subcomponent Summary:
150 kVA. 3 phase. Industrial Encapsulated. Copper Windings.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
2,450	39.1	38.5	26.0	19.8	21.6	>33

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

Unit is rigid base mounted to the seismic table using (4) 5/8" Grade 5 bolts.
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

TRU PROJECT NO. 1800840

UUT 9

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type F and K (Cast Resin Construction)
Model Number: 300 kVA ***Serial Number:*** N/A

Product Construction Summary:
NEMA 3R carbon steel enclosure.

Options/Subcomponent Summary:
3 Phase. Coordinated bus enclosure. Copper and aluminum windings. (2) Cast resin construction coils with copper and aluminum windings; (1) Vacuum pressure impregnated (VPI) coil with copper and aluminum windings.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
3,870	50.0	76.0	74.1	8.3	11.5	30.7

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

Unit is rigid base mounted to the seismic table using (8) 5/8" Grade 8 bolts.
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

TRU PROJECT NO. 1800840

UUT 10

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Type F and K (Cast Resin Construction)
Model Number: 3750 kVA ***Serial Number:*** N/A

Product Construction Summary:
NEMA 3R carbon steel enclosure.

Options/Subcomponent Summary:
3 Phase. Coordinated bus enclosure. Copper and aluminum windings. (2) Cast resin construction coils with copper and aluminum windings; (1) Vacuum pressure impregnated (VPI) coil with copper and aluminum windings.

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
16,595	72.0	125.0	111.0	4.0	4.3	20.7

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

Unit is rigid base mounted to the seismic table using (18) 3/4" Grade 8 bolts.
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

TRU PROJECT NO. 1800840

UUT 11

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Transformer Product Families
Model Number: HZ3A0003KBKB-WW1 ***Serial Number:*** AB00705130

Product Construction Summary:
NEMA 3R carbon steel enclosure.

Options/Subcomponent Summary:
Titan 2 kVA, copper core

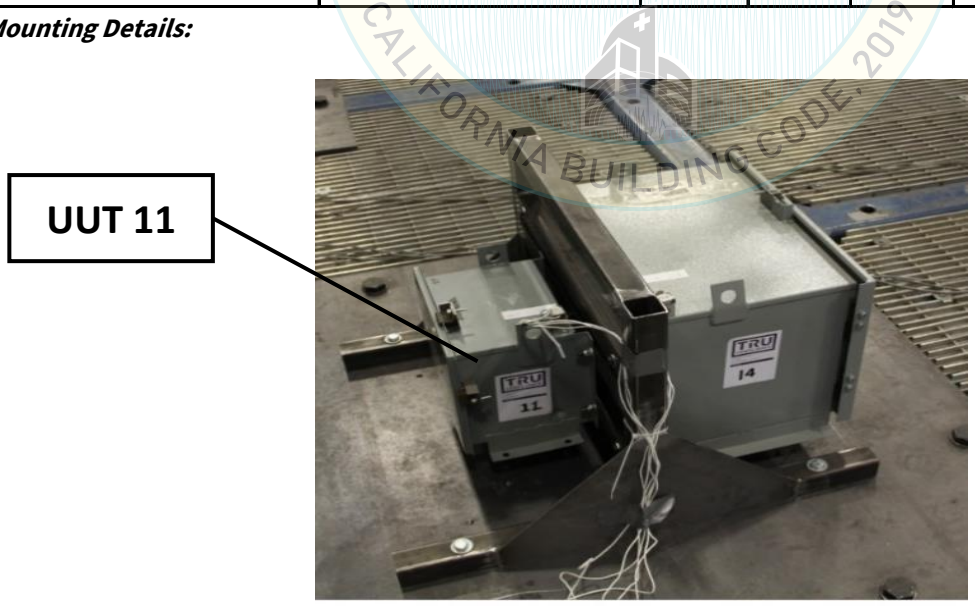
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
75	8.8	12.3	13.2	N/A	N/A	N/A

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:



UUT 11 was wall mounted-rigid using four (4) 1/2" Grade 5 bolts with four (4) 1/2" 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

TRU PROJECT NO. 1800840

UUT 12

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Transformer Product Families
Model Number: 226942-OSHPD ***Serial Number:*** AB00708494

Product Construction Summary:
NEMA 3R carbon steel enclosure.

Options/Subcomponent Summary:
Titan 15kVA, copper and aluminum core

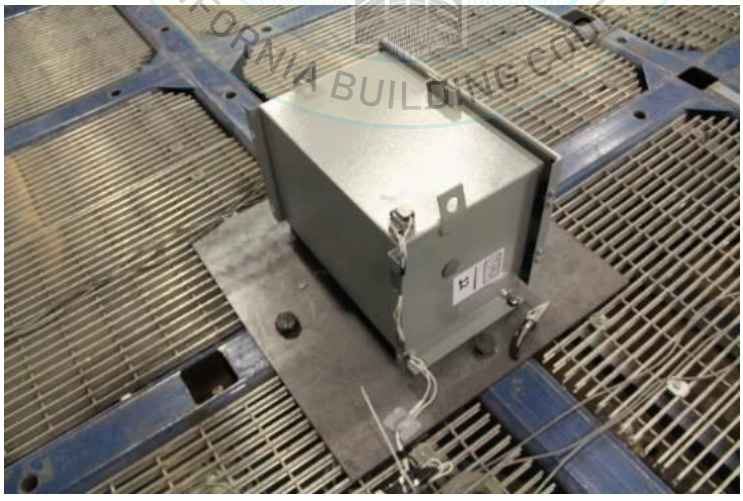
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
295	14.0	21.3	17.0	22.09	22.25	>33.3

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:



UUT12 was base mounted-rigid with four (4) 1/2" Grade 5 bolts and four (4) 1/2" 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

TRU PROJECT NO. 1800840

UUT 13

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Transformer Product Families
Model Number: HZ3A0003KBKB-WW1 ***Serial Number:*** AB00705130

Product Construction Summary:
NEMA 3R carbon steel enclosure.

Options/Subcomponent Summary:
Titan 2 kVA, copper core

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
75	8.8	12.3	13.2	>33.3	33.00	23.38

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

UUT13 was base mounted-rigid with (3) 3/8" Grade 5 bolts and (3) 3/8" 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

TRU PROJECT NO. 1800840

UUT 14

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Transformer Product Families
Model Number: 226942-OSHPD ***Serial Number:*** AB00708493

Product Construction Summary:
NEMA 3R carbon steel enclosure.

Options/Subcomponent Summary:
Titan 15kVA, copper and aluminum core

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
295	14.1	21.3	17.0	N/A	N/A	N/A

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

UUT14 was wall mounted-rigid with four (4) 1/2" Grade 5 bolts and four (4) 1/2" 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

TRU PROJECT NO. 1800840

UUT 15

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Transformer Product Families
Model Number: 225745-WW8 ***Serial Number:*** CB0906533

Product Construction Summary:
NEMA 1 carbon steel enclosure.

Options/Subcomponent Summary:
Titan 30kVA, copper core

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
470	17.0	23.8	21.8	10.04	12.45	13.11

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

UUT15 was base mounted-rigid with four (4) 1/2" Grade 5 bolts and four (4) 1/2" 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

TRU PROJECT NO. 1800840

UUT 16

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Transformer Product Families
Model Number: 226943-WW2 ***Serial Number:*** AA00710195

Product Construction Summary:
NEMA 3R carbon steel enclosure.

Options/Subcomponent Summary:
Titan 150kVA, aluminum core

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
3520	27.0	43.0	36.0	11.37	9.93	9.79

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

UUT16 was base mounted-rigid with (7) 1/2" Grade 5 bolts with flat washers and (1) 3/8" Grade 5 bolt with flat washer.
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

TRU PROJECT NO. 1800840

UUT 17

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Transformer Product Families
Model Number: XG3N0015LE ***Serial Number:*** CB000916487

Product Construction Summary:
NEMA 3R carbon steel enclosure.

Options/Subcomponent Summary:
Sentinel 15kVA, copper and aluminum core

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
160	20.1	21.5	22.0	14.00	14.34	26.91

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

UUT17 was base mounted-rigid with four (4) 1/2" Grade 5 bolts and four (4) 1/2" 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

TRU PROJECT NO. 1800840

UUT 18

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Transformer Product Families
Model Number: 45-OSHPD-CUAL ***Serial Number:*** CB00924392

Product Construction Summary:
NEMA 3R carbon steel enclosure.

Options/Subcomponent Summary:
Sentinel 45kVA, copper and aluminum core

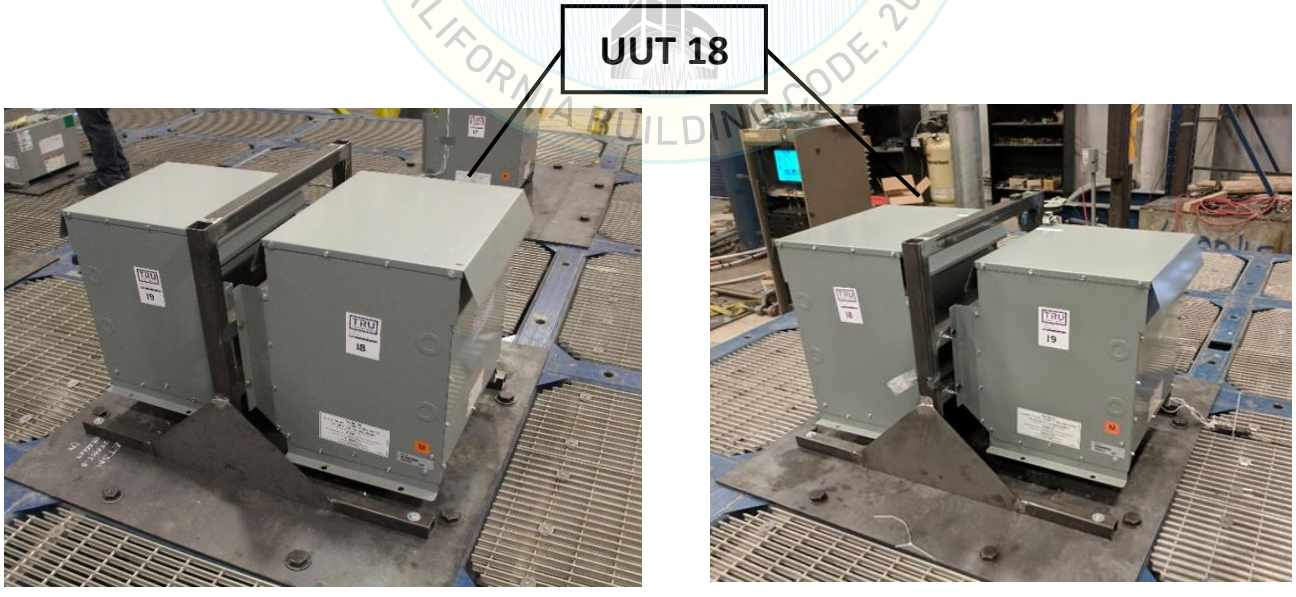
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
430	25.8	23.8	28.8	N/A	N/A	N/A

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:



UUT18 was wall mounted-rigid with four (4) 1/2" Grade 5 bolts and four (4) 1/2" 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

TRU PROJECT NO. 1800840

UUT 19

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Transformer Product Families
Model Number: XG3N0015LE ***Serial Number:*** CB00916491

Product Construction Summary:
NEMA 3R carbon steel enclosure.

Options/Subcomponent Summary:
Sentinel 15kVA, copper and aluminum core

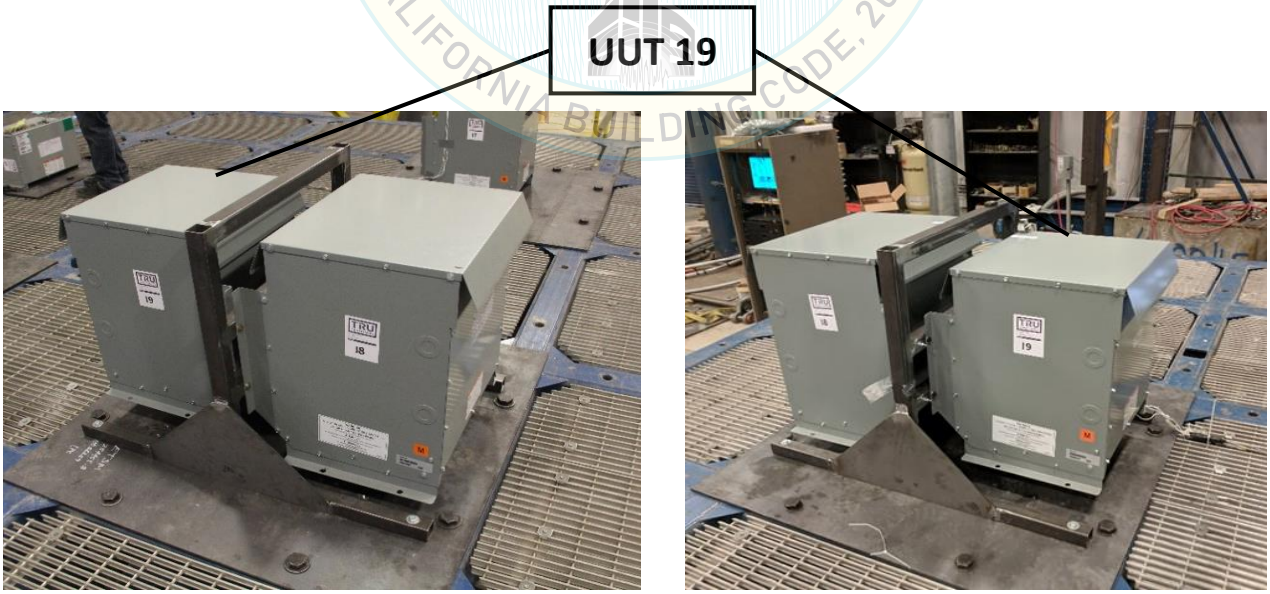
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
160	21.5	20.1	22	N/A	N/A	N/A

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:



UUT19 was wall mounted-rigid with four (4) 1/2" Grade 5 bolts and four (4) 1/2" 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

TRU PROJECT NO. 1800840

UUT 20

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Transformer Product Families
Model Number: 45-OSHPD-CUAL ***Serial Number:*** CB00924391

Product Construction Summary:
NEMA 3R carbon steel enclosure.

Options/Subcomponent Summary:
45kVA Sentinel, copper core

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
430	25.8	23.8	28.8	10.29	9.16	13.80

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

UUT20 was base mounted-rigid with four (4) 1/2" Grade 5 bolts and four (4) 1/2" 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

TRU PROJECT NO. 1800840

UUT 21

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Transformer Product Families
Model Number: 225712-WW4 ***Serial Number:*** C000906540

Product Construction Summary:
NEMA 3R carbon steel enclosure.

Options/Subcomponent Summary:
90kVA Titan, copper core

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1600	26.0	35.1	26.8	11.35	11.43	11.51

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

UUT21 was base mounted-rigid with four (4) 1/2" Grade 5 bolts and four (4) 1/2" 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

TRU PROJECT NO. 1800840

UUT 22B

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Transformer Product Families
Model Number: 225745-WW8 ***Serial Number:*** CB0906533

Product Construction Summary:
NEMA 1 carbon steel enclosure.

Options/Subcomponent Summary:
Titan 30kVA, copper core

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
470	17	23.8	21.8	N/A	N/A	N/A

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

UUT22B was wall mounted-rigid with four (4) 1/2" Grade 5 bolts and four (4) 1/2" washers. Standard 16ga. wall mount flanges were welded to the unit. Flanges on production models will be continuous and integral rather than welded.
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

TRU PROJECT NO. 1800840

UUT 23

Manufacturer: Hammond Power Solutions, Inc.
Model Line: Transformer Product Families
Model Number: 45-OSHPD-CUAL ***Serial Number:*** CB00924391

Product Construction Summary:
NEMA 3R carbon steel enclosure. Fasteners from all PEM nuts removed prior to test.

Options/Subcomponent Summary:
45kVA Sentinel, copper core

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
430	25.8	23.8	28.8	9.43	8.63	13.64

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 (2015)	2.0	1.0	1.5	3.20	2.40	1.33	0.53

Test Mounting Details:

Note that UUT23 was previously tested as UUT 20. All pem nuts were removed from UUT 20 to create the new test unit. UUT23 was base mounted-rigid with four (4) 1/2" Grade 5 bolts and four (4) 1/2" washers.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
Contents were included in testing per operating conditions.