



**OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION**

**APPLICATION FOR OSHPD SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)**

OFFICE USE ONLY

APPLICATION #: **OSP – 0332 – 10**

OSHPD Special Seismic Certification Preapproval (OSP)

Type: New Renewal

Manufacturer Information

Manufacturer: Rex Power Magnetics

Manufacturer's Technical Representative: Levon Hasserjian

Mailing Address: 65 Basaltic Road, Concord, ON, Canada L4K 1G4

Telephone: 905.695.8844 Email: levon@rexpowermagnetics.com

Product Information

Product Name: Dry Type Power Transformers

Product Type: Dry Type Power Transformers

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

General Description: Dry-type transformer family. Floor mounted, 7.5 to 8500 kVA, aluminum and copper windings, Winding Type: Barrel, Barrel w/ Shield, Disc, Disc w/ Shield, Cast, Cast w/ shield. NEMA type 1 or 3 enclosure; One or three phase and various options (see attached tables for further details)

Mounting Description: Rigid Floor mounted

Applicant Information

Applicant Company Name: Tobolski Watkins Engineering Inc.

Contact Person: Derrick Watkins, Ph.D., S.E.

Mailing Address: 9246 Lightwave Ave, Suite 140

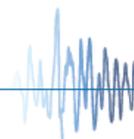
Telephone: 858.381.5843 Email: d Watkins@tobolskiwatkins.com

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2013.

Signature of Applicant: *Derrick Watkins* Date: 5/14/2013

Title: Executive Vice President Company Name: Tobolski Watkins Engineering Inc.

"Access to Safe. Quality Healthcare Environments that Meet California's Diverse and Dvnamic Needs"





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

Company Name: Tobolski Watkins Engineering, Inc.

Name: Derrick Watkins, Ph.D., S.E. California License Number: S 5257

Mailing Address: 9246 Lightwave Ave, San Diego, CA 92122

Telephone: 858.381.5843 Email: dwatkins@tobolskiwatkins.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): _____

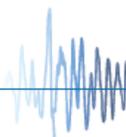
Testing Laboratory

Company Name: US Army Engineering Research and Development Center, Construction Engineering Research Laboratory

Contact Name: James Wilcoski

Mailing Address: 2902 Newmark Drive, Champaign, IL 61826-1076

Telephone: 217.373.6763 Email: James.wilcoski@usace.army.mil





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Seismic Parameters

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

Design Basis of Equipment or Components (F_p/W_p) = 1.8

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

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) = 2.5

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = 1.0

Equipment or Component Natural Frequencies (Hz) = Varies (see attached tables)

Overall dimensions and weight (or range thereof) = Varies (see attached tables)

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, 2010: Yes No

List of Attachments Supporting Special Seismic Certification

Test Report(s) Drawings Calculations Manufacturer's Catalog

Other(s) (Please Specify): UUT summary tables, Product Matrix

OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2019

Signature: 

Date: August 1, 2013

Print Name: Timothy J. Piland

Title: SSE

Special Seismic Certification Valid Up to : S_{DS} (g) = See Application

z/h = 1.0

Condition of Approval (if applicable): _____





Table 1

Special Seismic Certification Certified Product Matrix

TWEI Project No.: 2012-0471-CO-002

Manufacturer: Rex Power Magnetics

Model Line: Dry Type Three Phase Power Transformer

Certified Product Construction Summary:

Type A mild carbon steel sheet metal enclosure with sizes ranging from 3 to 7

Certified Options Summary:

Winding material: Aluminum or Copper; One or Three Phase

Winding Type: Barrel, Barrel W/ Shield

NEMA type 1 or 3

Certified Mounting Summary:

Base-mounted

Building Code: IBC 2012/CBC 2013

Seismic Certification Limits:

$S_{DS} = 2.50g$

$z/h = 1.0$

$I_p = 1.5$

Model Line	Enclosure Size	kVA Range	Dimension (in)			Weight (lb)	Notes	UUT
			Depth	Width	Height			
Type: A Models: S, M	4	7.5 - 30	16.00	15.75	21.00	95	7.5 kVA Tested	1
	5	30 - 40	16.00	20.50	21.00	200		
	6	35 - 60	21.00	20.50	26.25	370		
	7	75 - 120	22.00	24.50	31.50	540		
Type: A Models: B, D, R, 3PR, C	3	3 - 20	11.00	15.50	14.25	85		
	4	9 - 50	16.00	15.75	21.00	160		
	5	15 - 90	16.00	20.50	21.00	200		
	6	45 - 175	21.00	20.50	26.25	370		
	7	75 - 350	22.00	24.50	31.50	540	75 kVA Tested	2

Model Definitions

S	Single Phase - Isolation		
M	Single Phase - AutoTransformer		
B	Three Phase - General purpose Isolation		
D	Three Phase - Drive		
R	Three Phase - AutoTransformer		
3PR	Single/Three Phase - Iron Core		
C	Single/Three Phase - Iron Core custom kVA		

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Table 2

Special Seismic Certification Certified Product Matrix

TWEI Project No.: 2012-0471-CO-002

Manufacturer: Rex Power Magnetics

Model Line: Dry Type Three Phase Power Transformer

Certified Product Construction Summary:

Type B mild carbon steel sheet metal enclosure with sizes ranging from 8 to 23

Certified Options Summary:

Winding material: Aluminum or Copper \\ Winding Type: Barrel, Barrel W/ Shield, Disc, Disc w/ Shield, Cast, Cast w/ shield
NEMA type 1 or 3 enclosure; One or three phase
Fans (YAHOA Electric Co.), Thermometer and controller (Qualitrol / Precimeasure)

Certified Mounting Summary:

Base-mounted

Building Code: IBC 2012/CBC 2013

Seismic Certification Limits:

S_{DS} = Varies

z/h = 1.0

I_p = 1.5

Model Line	Enclosure Size	kVa	Dimension (in)			Weight (lb)	Notes	S_{DS} (g)	UUT
			Depth	Width	Height				
Type B Model: S, M	8	25 - 200	28.00	31.00	31.50	500		2.50	
	9	250 - 600	31.00	40.00	44.00	900		2.50	
	10	333 - 800	40.00	46.00	62.00	1900		2.10	
	11	500 - 1500	45.00	60.00	70.00	2700		2.10	
	12	833 - 2500	46.00	73.00	80.0	4200		2.10	
	13	1000 - 3000	48.00	80.00	91.50	5200		2.10	
	14	1500 - 3500	60.00	90.00	91.50	11000		2.10	
	15	2000 - 4000	60.00	90.00	100.00	13000		2.10	
	16	1000 - 1250	60.00	100.00	100.00	8120		2.10	
	17	1500 - 2000	60.00	100.00	110.00	11000		2.10	
	18	1750 - 2250	60.00	110.00	110.00	12000		2.10	
	19	2000 - 2500	60.00	110.00	120.00	13000		2.10	
	20	2250 - 2750	72.00	110.00	110.00	15000		2.10	
	21	2500 - 3000	72.00	120.00	120.00	18000		2.10	
22	3000 - 4000	72.00	130.00	130.00	21000		2.10		
23	3850 - 4500	72.00	140.00	140.00	23000		2.10		
Type B Model: B, D R, 3PR, C	8	25 - 450	28.00	31.00	31.50	970	25 kVA tested	2.50	3
	9	55 - 1500	31.00	40.00	44.00	1750	55 kVA tested	2.50	5
	10	500 - 2000	40.00	46.00	62.00	2300		2.10	
	11	750 - 2500	45.00	60.00	70.00	4250		2.10	
	12	1000 - 3000	46.00	73.00	80.0	6100		2.10	
	13	1500 - 2000	48.00	80.00	91.50	8100		2.10	
	14	2500 - 3000	60.00	90.00	91.50	11000		2.10	
	15	3000 - 3500	60.00	90.00	100.00	13000		2.10	

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Table 2

Special Seismic Certification Certified Product Matrix

TWEI Project No.: 2012-0471-CO-002

Manufacturer: Rex Power Magnetics

Model Line: Dry Type Three Phase Power Transformer

Certified Product Construction Summary:

Type B mild carbon steel sheet metal enclosure with sizes ranging from 8 to 23

Certified Options Summary:

Winding material: Aluminum or Copper \\ Winding Type: Barrel, Barrel W/ Shield, Disc, Disc w/ Shield, Cast, Cast w/ shield
NEMA type 1 or 3 enclosure; One or three phase
Fans (YAHOA Electric Co.), Thermometer and controller (Qualitrol / Precimeasure)

Certified Mounting Summary:

Base-mounted

Building Code: IBC 2012/CBC 2013

Seismic Certification Limits:

S_{DS} = Varies

z/h = 1.0

I_p = 1.5

Model Line	Enclosure Size	kVa	Dimension (in)			Weight (lb)	Notes	S_{DS} (g)	UUT
			Depth	Width	Height				
Type B Model: B, D R, 3PR, C	16	500 - 1000	60.00	100.00	100.00	6450		2.10	
	17	600 - 1000	60.00	100.00	110.00	7250		2.10	
	18	750 - 1250	60.00	110.00	110.00	8750		2.10	
	19	1250 - 1750	60.00	110.00	120.00	12800		2.10	
	20	1750 - 2250	72.00	110.00	110.00	15000		2.10	
	21	2750 - 3250	72.00	120.00	120.00	23300		2.10	
	22	6000 - 7000	72.00	130.00	130.00	26500	6000 kVA tested	2.10	4 ⁽¹⁾
	23	7500 - 8500	72.00	140.00	140.00	29000		2.10	

Model Definitions

S	Single Phase - Isolation			
M	Single Phase – AutoTransformer			
B	Three Phase – General purpose Isolation			
D	Three Phase – Drive			
R	Three Phase – AutoTransformer			
3PR	Single/Three Phase – Iron Core			
C	Single/Three Phase – Iron Core custom kVA			

⁽¹⁾ UUT 4 Tested to 2.1g S_{DS}

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UUT – 1

UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2012-0471-CO-001

Manufacturer: Rex Power Products

Model Line: Dry Type Transformer

Model Number: 7.5kVA

Product Construction Summary:
Enclosure number 4 - Type A - NEMA 1 type enclosure, ventilated, mild carbon steel sheet metal

Options/Subcomponent Summary:
Barrel wound copper coil

UUT Properties

Weight (lb)	Dimensions (in)			Cabinet Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
95	13.62	18.5	15.5	20.9	30.5	>33.0

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
CBC 2013	ICC-ES AC 156	2.5	1.0	1.5	4.0	3.0	1.67	0.67

Test Mounting Details:



Unit is rigid base mounted to the test fixture using a total of four (4) 5/8" diameter grade 5 bolts.
Unit maintained structural integrity and remained functional per manufacturer requirement.

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UUT – 2

**UNIT UNDER TEST (UUT)
Summary Sheet**

TWEI Project No.: 2012-0471-CO-001

Manufacturer: Rex Power Products

Model Line: Dry Type Transformer

Model Number: 75kVA

Product Construction Summary:
Enclosure number 7 - Type A - NEMA 3 type enclosure, ventilated, mild carbon steel sheet metal

Options/Subcomponent Summary:
barrel wound aluminum coil (Rex Power)

UUT Properties

Weight (lb)	Dimensions (in)			Cabinet Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
540	19.25	27.38	31.50	5.9	6.5	>33.0

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
CBC 2013	ICC-ES AC 156	2.5	1.0	1.5	4.0	3.0	1.67	0.67

Test Mounting Details:



Unit is rigid base mounted to the test fixture using a total of four (4) 1/2" diameter grade 5 bolts.
Unit maintained structural integrity and remained functional per manufacturer requirement.

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UUT – 3

**UNIT UNDER TEST (UUT)
Summary Sheet**

TWEI Project No.: 2012-0471-CO-001

Manufacturer: Rex Power Products

Model Line: Transformer

Model Number: 25kVA

Product Construction Summary:
Enclosure number 8 - Type B - NEMA 3R type enclosure, ventilated, mild carbon steel sheet metal

Options/Subcomponent Summary:
Aluminum disc wound coil

UUT Properties

Weight (lb)	Dimensions (in)			Cabinet Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
450	29.75	30.75	31.75	25.3	8.7	>33.0

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
CBC 2013	ICC-ES AC 156	2.5	1.0	1.5	4.0	3.0	1.67	0.67

Test Mounting Details:



Unit is rigid base mounted to the test fixture using a total of four (4) 1/2" diameter grade 5 bolts.
Unit maintained structural integrity and remained functional per manufacturer requirement.

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UUT – 4

UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2012-0471-CO-001

Manufacturer: Rex Power Products

Model Line: Transformer

Model Number: 6000kVA

Product Construction Summary:

Enclosure number 12+, Type B, NEMA 1 type enclosure, ventilated, mild steel sheet metal. Transformer windings are supported on their own mild carbon structural steel frame, separate from the enclosure.

Options/Subcomponent Summary:

Copper disc winding with shield (Rex Power), Aluminum barrel winding (Rex Power), copper cast winding (Rex Power), 200mm" diameter (~8") cooling fan (YAHOA Electric Fans), 280mm" diameter (~11") cooling fan (YAHOA Electric Fans), Digital thermometer with controller (Precimeasure), Digital thermometer with controller (Qualitrol)

UUT Properties

Weight (lb)	Dimensions (in)			Cabinet Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
26,500	70.0	150.0	124.0	8.2	2.1	17.5

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
CBC 2013	ICC-ES AC 156	2.1	1.0	1.5	3.4	2.5	1.4	0.56

Test Mounting Details:



Unit is rigid base mounted to the test fixture using eight (8) 1/2" diameter grade 5 bolts for the enclosure and twelve (12) 1" diameter grade 5 bolts for the transformer assembly.

Unit maintained structural integrity and remained functional per manufacturer requirement.



UUT – 5

UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2012-0471-CO-001

Manufacturer: Rex Power Products

Model Line: Dry Type Transformer

Model Number: 55kVA

Product Construction Summary:

Enclosure Number 9, Type B, NEMA 3 type enclosure, ventilated, carbon steel sheet metal. Transformer windings are supported on their own carbon structural steel frame, separate from the enclosure.

Options/Subcomponent Summary:

Primary Copper cast barrel winding with VPI secondary Winding (Rex Power)

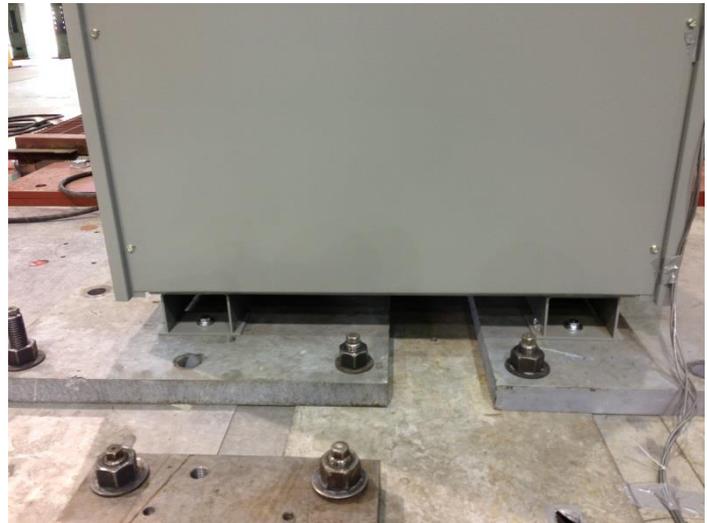
UUT Properties

Weight (lb)	Dimensions (in)			Cabinet Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
680	38.0	40.0	44.8	9.4	18.4	>33.0

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S _{DS}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
CBC 2013	ICC-ES AC 156	2.5	1.0	1.5	4.0	3.0	1.67	0.67

Test Mounting Details:



Unit is rigid base mounted to the test fixture using four (4) 1/2" diameter grade 5 bolts.
Unit maintained structural integrity and remained functional per manufacturer requirement.

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