# APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

**APPLICATION #: OSP-0110**

## OSHPD Special Seismic Certification Preapproval (OSP)

**Type:** ☐ New ☒ Renewal

## Manufacturer Information

Manufacturer: Powersmiths International Corp.

Manufacturer's Technical Representative: Des Faria

Mailing Address: 8989 Airport Road, Brampton, ON L6T5T2

Telephone: (905) 791-1493 Email: dfaria@powersmiths.com

## Product Information

Product Name: Transformers

Product Type: Transformers – Dry Type

Product Model Number: Various - See Attachment

General Description: Dry-Type transformer family. Including a range of KVA ratings, construction materials, and enclosure types. (See attachment for further details)

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: 233 SW Wilson Ave, Suite 101, Bend, OR 97702

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

Title: Manager, 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: UNIVERSITY OF BUFFALO (SEESL)

Contact Person: Mark C. Pitman

Mailing Address: 212 Ketter Hall, Buffalo NY 14260

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

## Seismic Parameters

Design Basis of Equipment or Components ($F_p/W_p$) = 1.44 (SDS = 2.0g); 1.13 (SDS = 2.5g)

$S_{DS}$ (Design spectral response acceleration at short period, g) = 2.0 (z/h = 1); 2.5 (z/h = 0)

$a_p$ (Amplification factor) = 1

$R_p$ (Response modification factor) = 2.5

$\Omega_0$ (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



## OSHPD Approval (For Office Use Only) - Approval Expires on 12/31/2025

Date: 9/15/2021

Name: Mohammad Aliaari Title: Senior Structural Engineer

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

## 2000448-CR-002-R0

POWERSMITHS Socomec Group

TRU COMPLIANCE

***Manufacturer:*** Powersmiths International Corp.
***Model Line:*** Dry-Type Transformer

**TABLE 1**

***Certified Product Construction Summary:***
Dry-Type transformers with seismic bracing, NEMA 1, 2 and 3R enclosures.

***Certified Options Summary:***
Copper and Aluminum Windings.

[1] Efficiency Classification - See model number nomenclature in Table 1.1

***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; $S_{DS}$ = 2.5 g z/h = 0.0 $I_P$ = 1.5

| Model Line[1] | Model | Dimensions (in) | | | Weight (lb) | Notes | UUT |
|---|---|---|---|---|---|---|---|
| | | Depth | Width | Height | | | |
| OPAL Series<br>E-Saver-80R<br>E-Saver-81R<br>E-Saver-10L<br>E-Saver-33L<br>E-Saver-10M<br>E-Saver-20M<br>E-Saver-10H<br>E-Saver-20H<br>E-Saver-25H<br>E-Saver-35H<br>E-Saver-50H<br>E-Saver-25S<br>E-Saver-35S<br>E-Saver-25V<br>T1000-30H<br>HC-AUTO | 15 kVA | 17 | 18 | 27.5 | 320 | E-Saver-25H | 2 |
| | 20 kVA | 18 | 26 | 30 | 380 | | Interp. |
| | 25 kVA | 18 | 26 | 30 | 420 | | Interp. |
| | 30 kVA | 18 | 26 | 30 | 470 | | Interp. |
| | 45 kVA | 18 | 26 | 30 | 590 | | Interp. |
| | 50 kVA | 22 | 32 | 40 | 600 | | Interp. |
| | 63 kVA | 22 | 32 | 40 | 720 | | Interp. |
| | 75 kVA | 22 | 32 | 40 | 800 | | Interp. |
| | 100 kVA | 22 | 32 | 40 | 975 | | Interp. |
| | 112.5 kVA | 22 | 32 | 40 | 1100 | | Interp. |
| | 125 kVA | 27 | 38 | 48 | 1250 | | Interp. |
| | 150 kVA | 27 | 38 | 48 | 1400 | | Interp. |
| | 175 kVA | 27 | 38 | 48 | 1500 | | Interp. |
| | 200 kVA | 27 | 38 | 48 | 1600 | | Interp. |
| | 225 kVA | 32 | 38 | 52 | 1750 | | Interp. |
| | 250 kVA | 32 | 38 | 52 | 1850 | | Interp. |
| | 300 kVA | 32 | 38 | 52 | 2150 | | Interp. |
| | 400 kVA | 38 | 52 | 61 | 2650 | | Interp. |
| | 450 kVA | 38 | 52 | 61 | 2900 | | Interp. |
| | 500 kVA | 38 | 52 | 61 | 3030 | | Interp. |
| | 600 kVA | 47 | 64 | 67 | 3800 | | Interp. |
| | 750 kVA | 47 | 64 | 67 | 4900 | | Interp. |
| | 850 kVA | 47 | 64 | 67 | 5000 | | Interp. |
| | 1000 kVA | 53 | 64 | 67 | 5445 | E-Saver-25H | 1 |

# SPECIAL SEISMIC CERTIFICATION
# CERTIFIED COMPONENT MATRIX

## 2000448-CR-002-R0

| | |
|---|---|
| ***Manufacturer:*** | Powersmiths International Corp. |
| ***Model Line:*** | Dry-Type Transformer |

**TABLE 1.1**

***For Reference Only***

**OPAL Transformer Nomenclature:**

**E-Saver - EFF L - kVA - Ph. - PV - SV - OPT**

- **E-Saver**: Models: E-Saver; E-Saver-1Ph (single phase); T1000 (Harm. Mitigating); ~~HC-Auto (Auto Transformer)~~; ~~N1000 (Auto Zero Sequence)~~
- **EFF**: Efficiency Level: XX: Percent loss reduction (5-99%)
- **L**: Load Optimization: L: Low; M: Medium; H: High; S: Solar; V: EV
- **kVA**: Rating: XXX: kVA; XXXA: Amps for N1000
- **Ph.**: Phase Shift (T1000 only): 0°; 15; 20; 30°; 40; 45 in degrees; *Standards
- **PV**: Primary Voltage: XXX: To 600V
- **SV**: Secondary Voltages*: XXX: To 600V; -XXX: 2nd; -XXX: 3rd; -XXX: 4th; *Except N1000
- **OPT**: Option List (as applicable): SB: Seismic Bracing; 3R: Outdoor; TXX: Temp.rise (T115, T80); F50: 50Hz; XS: Shields (1S, 2S, 3S); 6T: Primary Taps (6 Taps); NX: Enclosure Type: 1, 2, 3R; TS: Thermal Sensor; SE: Sensitive Environment; CU: Copper Conductors; AI: Aluminum Conductors; CA: Copper/Aluminum hybrid; KX: K-Factor; 4, 7, 9, 13, 20; LI: Low Inrush; IRP: Rotatable IR Port; HD: Hinged Door; XX: Other e.g. COL - Color

**Model Descriptions:**

E-Saver: A 3-phase isolation distribution transformer available in the range of 15kVA to 1,000kVA. They are either Copper, Aluminium or a combination of either. The efficiency optimization in the part number is defined by the 2 letter numeric numberers followed by an alpha character following the model name. E-Saver-1PH is a single-phase version. The T1000 is a harmonic mitigating transformer with a model name that has been maintained due to existing branding for harmonic applications. The HC-AUTO is a auto transformer where the secondary is electrically connected to the primary for voltage ratio applications.

Model numbers are described following:

| | |
|---|---|
| E-Saver-80R-kVA-PV-SV | Aluminum wound, efficiency optimized for lower loading applications |
| E-Saver-81R-kVA-PV-SV | Copper wound, efficiency optimized for lower loading applications |
| E-Saver-10L-kVA-PV-SV | Aluminum wound, efficiency optimized for low loading applications |
| E-Saver-33L-kVA-PV-SV | Copper wound, efficiency optimized for low loading applications |
| E-Saver-10M-kVA-PV-SV | Aluminum wound, efficiency optimized for average loading applications |
| E-Saver-20M-kVA-PV-SV | Copper wound, efficiency optimized for average loading applications |
| E-Saver-10H-kVA-PV-SV | Aluminum wound, efficiency optimized for high loading applications |
| E-Saver-20H-kVA-PV-SV | Aluminum wound, efficiency optimized for high loading applications |
| E-Saver-25H-kVA-PV-SV | Copper/Aluminum wound, efficiency optimized for high loading applications |
| E-Saver-35H-kVA-PV-SV | Copper/Aluminum wound, efficiency optimized for higher loading applications |
| E-Saver-50H-kVA-PV-SV | Copper/Aluminum wound, efficiency optimized for very high loading applications |
| E-Saver-25S-kVA-PV-SV | Aluminum wound, efficiency optimized for solar applications |
| E-Saver-35S-kVA-PV-SV | Copper wound, highly efficiency optimized for solar applications |
| E-Saver-25V-kVA-PV-SV | Copper/Aluminum wound, efficiency optimized for EV Charging applications |
| T1000-30H-kVA-PV-SV | Copper wound, efficiency optimized for Harmonic Mitigation applications |
| HC-AUTO-kVA-PV-SV | Copper or Aluminum wound voltage ratio transformer |

Note: The Aluminum or Copper/Aluminum wound transformers are available as all copper versions with CU added in the options section of the nomenclature

# SPECIAL SEISMIC CERTIFICATION
# CERTIFIED COMPONENT MATRIX

## 2000448-CR-002-R0

| | | |
|---|---|---|
| ***Manufacturer:*** | Powersmiths International Corp. | **TABLE 1.1** |
| ***Model Line:*** | Dry-Type Transformer | |

***For Reference Only***

E-Saver-1Ph is the single-phase model

**T1000:** A 3-phase copper wound isolation transformer available from 15 to 1,000kVA optimized for harmonic mitigation applications. Typical model numbers include as follows but not limited to:

- E-Saver-35H-kVA-PV-SV…: Copper wound, efficiency optimized for higher loading harmonic mitigation applications

# UNIT UNDER TEST (UUT) SUMMARY SHEET

## 2000448-CR-002-R0

***Manufacturer:*** Powersmiths International Corp.

***Model Line:*** Dry-Type Transformer

| UUT | Unit Description | Report Number | Testing Laboratory | $S_{DS}$ | z/h | $I_P$ |
|---|---|---|---|---|---|---|
| 1 | E-Saver OPAL (1000 kVA) with seismic bracing | 2000448-TR-001-R0 | Structural and Earthquake Engineering and Simulation Labortory | 2.0<br>2.5 | 1.0<br>0.0 | 1.5 |
| 2 | E-Saver OPAL (15 kVA) with seismic bracing | 2000448-TR-001-R0 | Structural and Earthquake Engineering and Simulation Labortory | 2.0<br>2.5 | 1.0<br>0.0 | 1.5 |
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***Notes:***

# UNIT UNDER TEST (UUT) SUMMARY SHEET

## 2000448-CR-002-R0

**UUT 1**

| | | | |
|---|---|---|---|
| ***Manufacturer:*** | Powersmiths International Corp. | | |
| ***Model Line:*** | Dry-Type Transformer | | |
| ***Model Number:*** | ESAVER-25H-1000-480-208Z6.8 | ***Serial Number:*** | 60555 |

***Product Construction Summary:***

Nema 3R carbon steel enclosure. Unit tested with factory installed seismic bracing.

***Options/Subcomponent Summary:***

Aluminum and Copper Windings

***UUT Properties***

| Weight (lb) | Dimension (in) | | | Lowest Natural Frequency (Hz) | | |
|---|---|---|---|---|---|---|
| | Depth | Width | Height | Front-Back | Side-Side | Vertical |
| 5,445 | 53.0 | 64.0 | 67 | 7.04 | 9.34 | 16.17 |

***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<br>2.5 | 1.0<br>0.0 | 1.5 | 3.2 | 2.4 | 1.67 | 0.67 |

***Test Mounting Details:***


UUT was rigid base mounted with eight (8) 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

## 2000448-CR-002-R0

**UUT 2**

***Manufacturer:*** Powersmiths International Corp.
***Model Line:*** Dry-Type Transformer
***Model Number:*** ESAVER-25H-15-480-208 ***Serial Number:*** 60608

***Product Construction Summary:***
Nema 3R carbon steel enclosure. Unit tested with factory installed seismic bracing.

***Options/Subcomponent Summary:***
Aluminum and Copper Windings

***UUT Properties***

| Weight (lb) | Dimension (in) | | | Lowest Natural Frequency (Hz) | | |
|---|---|---|---|---|---|---|
| | Depth | Width | Height | Front-Back | Side-Side | Vertical |
| 320 | 17 | 18 | 27.5 | 15.78 | 17.35 | 18.22 |

***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<br>2.5 | 1.0<br>0.0 | 1.5 | 3.2 | 2.4 | 1.67 | 0.67 |

***Test Mounting Details:***


UUT was rigid base mounted with four (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.