



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

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

OFFICE USE ONLY

APPLICATION #: OSP-0689

OSHPD Special Seismic Certification Preapproval (OSP)

Type: New Renewal

Manufacturer Information

Manufacturer: Hitachi Power Grids

Manufacturer's Technical Representative: Brian Akers

Mailing Address: 171 Industry Drive, Bland, VA 24315

Telephone: (276) 688-1673

Email: brian.akers@hitachi-powergrids.com

Product Information

Product Name: Transformers

Product Type: Transformers – Dry Type

Product Model Number: Copper Wiring and Aluminum Wiring Coil Transformers

General Description: These transformers are built with either copper or aluminum coils and are optionally braced within their enclosures with L-frames or A-frames.

Mounting Description: Rigid, Floor Mounted

Tested Seismic Enhancements: Seismic enhancements made to the test units and/or modifications required to address anomalies during the tests shall be incorporated into the production units.

Applicant Information

Applicant Company Name: Forell/Elsesser Engineers

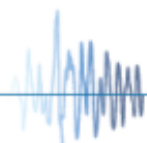
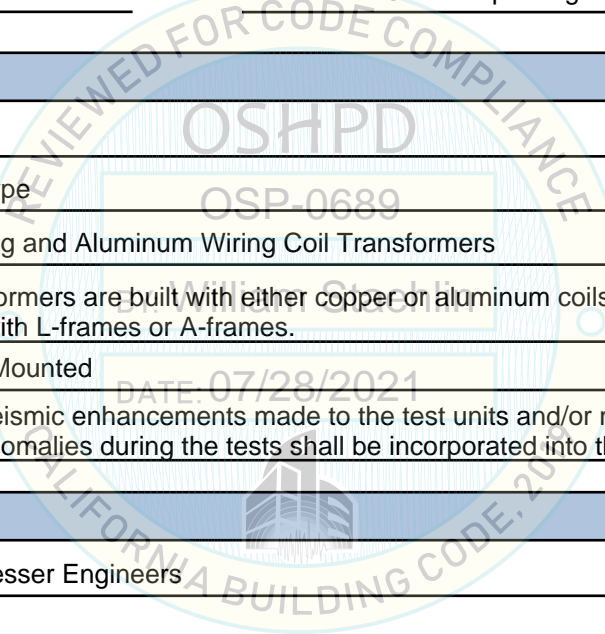
Contact Person: Christopher Tung

Mailing Address: 160 Pine Street, 6th Floor, San Francisco, CA 94111

Telephone: (415) 248-3047

Email: c.tung@forell.com

Title: Engineer





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

Company Name: FORELL / ELSESSER ENGINEERS, INC.
Name: Marco Scanu California License Number: S4454
Mailing Address: 160 Pine Street, Suite 600, San Francisco, CA 94111
Telephone: (415) 837-0700 Email: scanu@forell.com

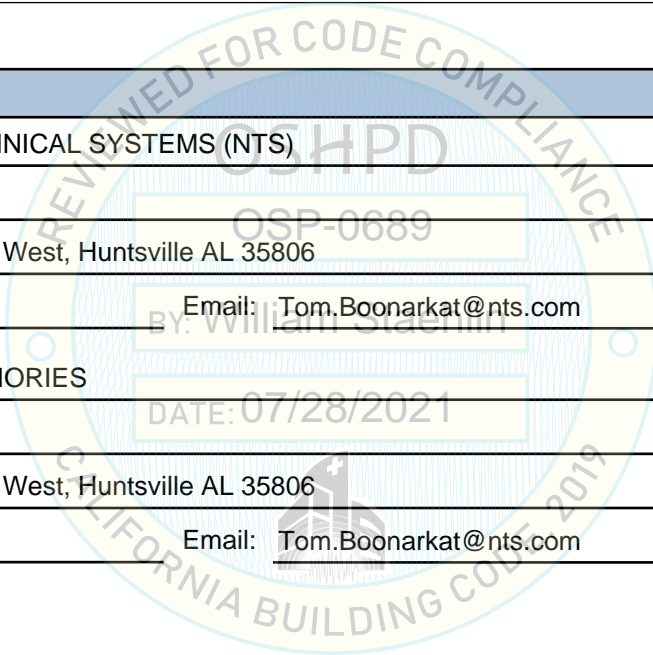
Certification Method

GR-63-Core ICC-ES AC156 IEEE 344 IEEE 693 NEBS 3
 Other (Please Specify): _____

Testing Laboratory

Company Name: NATIONAL TECHNICAL SYSTEMS (NTS)
Contact Person: Tom Boonarkat
Mailing Address: 7800 Highway 20 West, Huntsville AL 35806
Telephone: (909) 908-2376 Email: Tom.Boonarkat@nts.com

Company Name: WYLE LABORATORIES
Contact Person: Tom Boonarkat
Mailing Address: 7800 Highway 20 West, Huntsville AL 35806
Telephone: (909) 908-2376 Email: Tom.Boonarkat@nts.com





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Seismic Parameters

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

SDS (Design spectral response acceleration at short period, g) = See Attachments

a_p (Amplification factor) = 1.0

R_p (Response modification factor) = 2.5

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 1

Natural frequencies (Hz) = See Attachment

Overall dimensions and weight = See Attachment

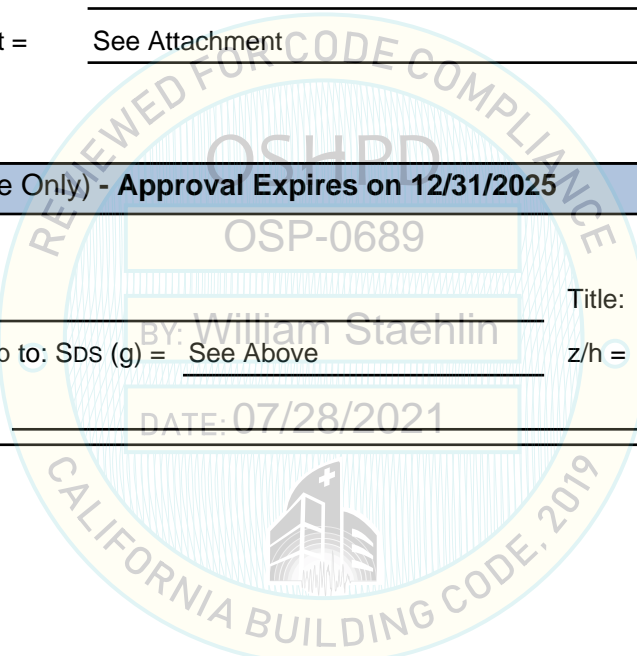
OSHPD Approval (For Office Use Only) - Approval Expires on 12/31/2025

Date: 7/28/2021

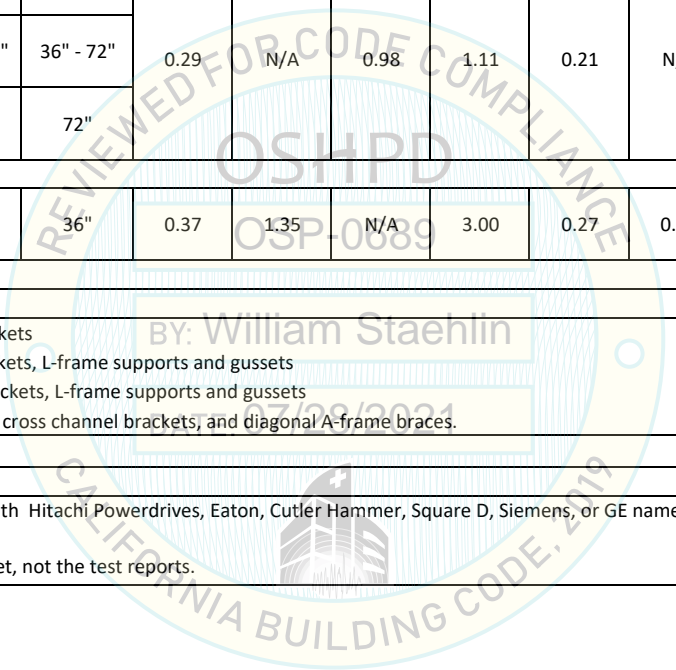
Name: William Staehlin Title: Senior Structural Engineer

Special Seismic Certification Valid Up to: SDS (g) = See Above z/h = 1

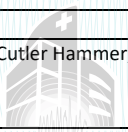
Condition of Approval (if applicable): DATE: 07/28/2021



Hitachi Power Drives Dry Type Transformers Product Range Summary													
Type	Max. Service Wt.	Height	Width	Depth	Bracing Configuration (max. S _{DS} per type)				Bracing Configuration				Testing Status
					A	B	C	D	A	B	C	D	
					S _{DS}	S _{DS}	S _{DS}	S _{DS}	F _p /W _p	F _p /W _p	F _p /W _p	F _p /W _p	
Copper Windings													
112 kVA Dry Type Transformer	2,400 lbs	60"	38"	36"	0.29	N/A	0.98	1.11	0.21	N/A	0.71	0.80	Test Report PR055313-TR-16 - UUT1A, UUT1C, UUT1D
Dry Type Transformer	2,400 lbs - 21,000 lbs	60" - 120"	38" - 138"	36" - 72"									Interpolated
3000 kVA Dry Type Transformer	21,000 lbs	120"	138"	72"									Test Report T55796-1 - UUT2A, UUT2C, UUT2D
Aluminum Windings													
112 kVA Dry Type Transformer	1,956 lbs	60"	48"	36"	0.37	1.35	N/A	3.00	0.27	0.97	N/A	2.16	Test Report 57467R10-1 - UUT3A, UUT3B, UUT3D
Bracing Types													
<p>Configuration A - two feet with core clamps and cross channel brackets</p> <p>Configuration B - two feet with core clamps and cross channel brackets, L-frame supports and gussets</p> <p>Configuration C - three feet with core clamps and cross channel brackets, L-frame supports and gussets</p> <p>Configuration D - three feet structural core clamps, core clamp and cross channel brackets, and diagonal A-frame braces.</p>													
Nameplate													
Hitachi Powerdrive transformers are delivered to the project site with Hitachi Powerdrives, Eaton, Cutler Hammer, Square D, Siemens, or GE nameplates. In all cases the units are designated as 0-30 MVA 3-Phase Dry Type Transformers. UUT numbers have been modified to match the UUT Summary Sheet, not the test reports.													



By: William Staehlin



Hitachi Power Grids – Dry Type Transformers

III. UUT Summary Sheets

Test Report PR055313-TR-16 – UUT1A, UUT1C, UUT1D

112kVA Dry Type Copper Wiring Transformer

60”H x 38”W x 36”D, 2,400 lbs

11 ga. Cold Formed Carbon Steel

Floor Mounted by welding

UUT1A - Configuration A: two feet with core clamps and cross channel brackets.

UUT1C - Configuration C: three feet with core clamps and cross channel brackets, L-frame supports and gussets

UUT1D - Configuration D: three feet structural core clamps, core clamp and cross channel brackets, and diagonal A-frame braces.



UUT1A - Configuration A:

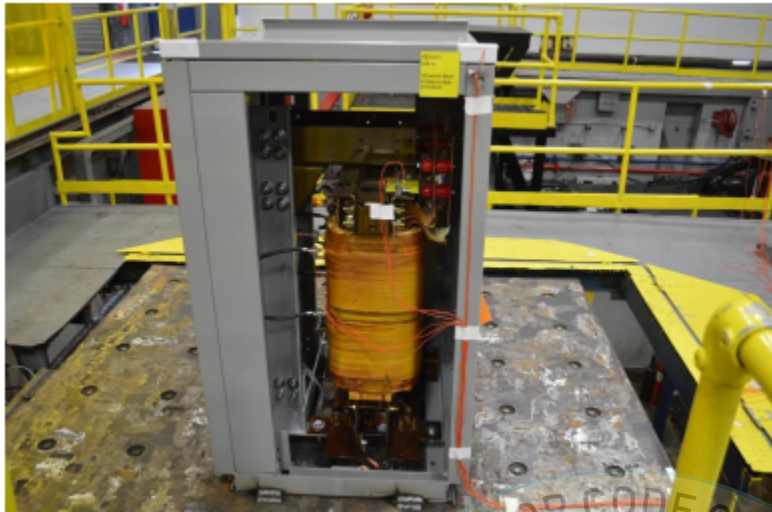


Building Code	Test Criteria	S _{DS} (g)	z/h	I _p	Horizontal		Vertical	
					A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2019	ICC-ES AC 156	0.44	1.0	1.5	0.70	0.53	0.29	0.12
Natural Frequencies (Hz)				Test Results				
F-B	S-S	V	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during testing.					
7.9	13	N/A						

OSP APPLICATION
Hitachi Power Grids – Dry Type Transformers
III. UUT Summary Sheets

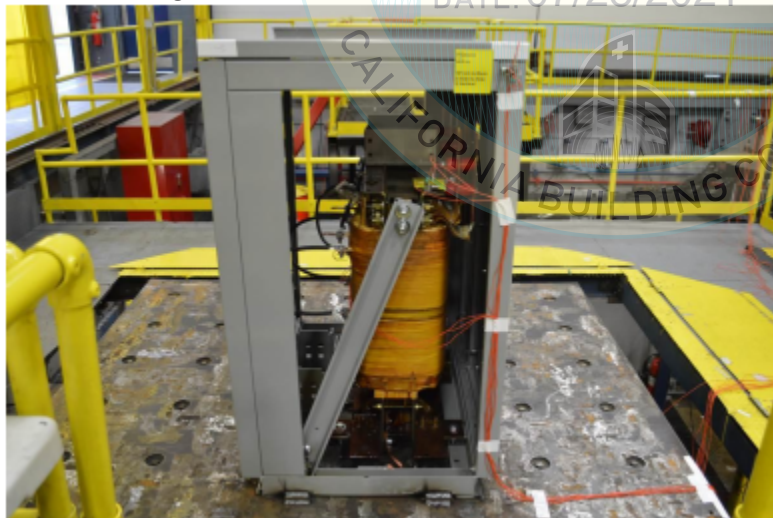
Date: 3/11/2021

UUT1C – Configuration C:



Building Code	Test Criteria	S _{Ds} (g)	z/h	I _p	Horizontal		Vertical	
					A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2019	ICC-ES AC 156	1.60	1.0	1.5	2.56	1.92	1.07	0.43
Natural Frequencies (Hz)					Test Results			
F-B	S-S	V	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during testing.					
15	15	N/A						

UUT1D – Configuration D:



Building Code	Test Criteria	S _{Ds} (g)	z/h	I _p	Horizontal		Vertical	
					A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2016	ICC-ES AC 159	3.16	1.0	1.5	5.06	3.79	2.12	0.84
Natural Frequencies (Hz)					Test Results			
F-B	S-S	V	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during testing.					
8.8	10.2	N/A						

Hitachi Power Grids – Dry Type Transformers
III. UUT Summary Sheets

Test Report T55796-1 – UUT2A, UUT2C, UUT2D

3000 kVa Copper Wiring Transformer & Enclosure (Largest)
120”H x 138”W x 72”D, 21,000 lbs
14 ga. Cold Formed Carbon Steel
Floor Mounted by welding



UUT2A - Configuration A: two feet with core clamps and cross channel brackets.

UUT2C - Configuration C: three feet with core clamps and cross channel brackets, L-frame supports and gussets

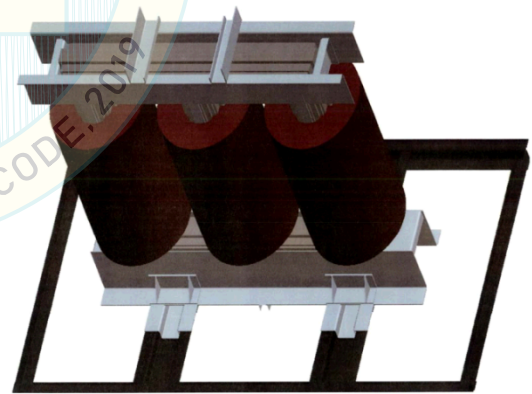
UUT2D - Configuration D: three feet structural core clamps, core clamp and cross channel brackets, and diagonal A-frame braces.

UUT2A – Configuration A:



BY: William Staehlin
DATE: 07/28/2021

Test Level 1 (0.3125 S_{ps})
Two Feet with Core Clamp and Cross Channel Brackets
All clamp, bracket and base material .25" with the exception
Of Core Clamp and Cross Channel Brackets(.375")



Building Code	Test Criteria	S _{Ds} (g)	z/h	I _p	Horizontal		Vertical	
					A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2019	ICC-ES AC 156	0.29	1.0	1.5	0.46	0.35	0.19	0.08
Natural Frequencies (Hz)					Test Results			
F-B	S-S	V	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during testing.					
1.7	6.6	20.0						

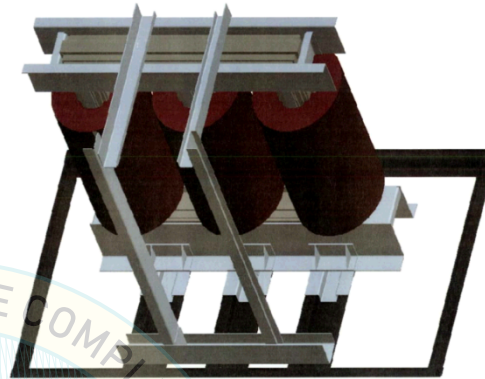
OSP APPLICATION
Hitachi Power Grids – Dry Type Transformers
III. UUT Summary Sheets

Date: 3/11/2021

UUT2C – Configuration C:



Test Level 3 (1,250 S₀₅)
Three Feet with Core Clamp and Cross Channel Brackets,
L-Frame supports and L-Frame Gussets
All clamp, bracket and base material .375" with the exception
Of L-Frame Gussets(.250")

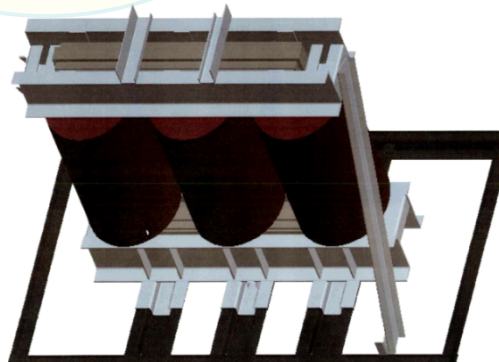


Building Code	Test Criteria	S _{DS} (g)	z/h	I _p	Horizontal		Vertical	
					A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2019	ICC-ES AC 156	0.98	1.0	1.5	1.57	1.18	0.66	0.26
Natural Frequencies (Hz)					Test Results			
F-B	S-S	V	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during testing.					
5.5	4.4	N/A						

UUT2D – Configuration D:



Test Level 4 (2,000 S₀₅)
Three Feet with Structural Core Clamps, Core Clamp and
Cross Channel Brackets, Diagonal A-Frame Support
All bracket and base material .375"

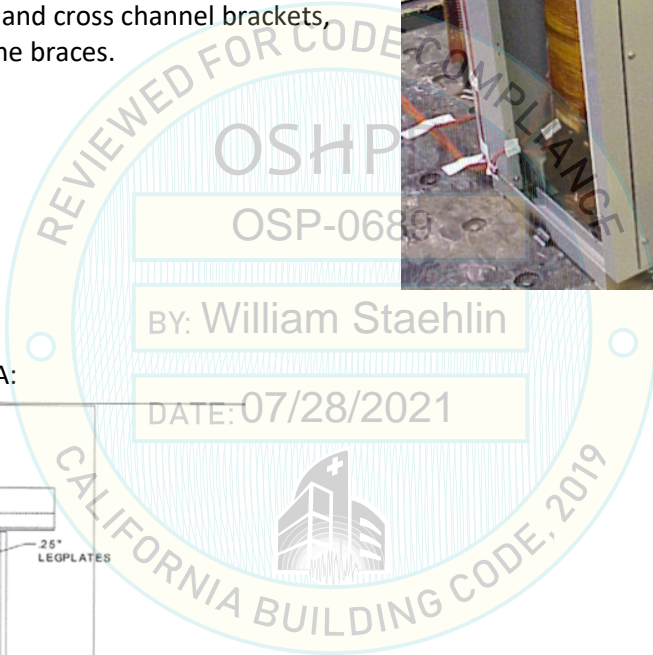


Building Code	Test Criteria	S _{DS} (g)	z/h	I _p	Horizontal		Vertical	
					A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2019	ICC-ES AC 156	1.11	1.0	1.5	1.78	1.33	0.74	0.30
Natural Frequencies (Hz)					Test Results			
F-B	S-S	V	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during testing.					
4.6	5.7	N/A						

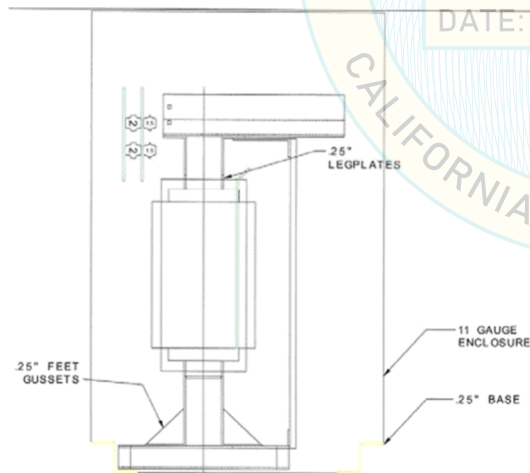
Test Report 57467R10-1 – UUT3A, UUT3B, UUT3D

112 kVA Aluminum Wiring Transformer & Enclosure
 60”H x 48”W x 36”D, 1,956 lbs
 11 ga. Cold Formed Carbon Steel
 Floor Mounted by welding

- UUT3A - Configuration A: two feet with core clamps and cross channel brackets.
- UUT3B - Configuration B: two feet with core clamps and cross channel brackets, L-frame supports and gussets
- UUT3D - Configuration D: three feet structural core clamps, core clamp and cross channel brackets, and diagonal A-frame braces.



UUT3A – Configuration A:

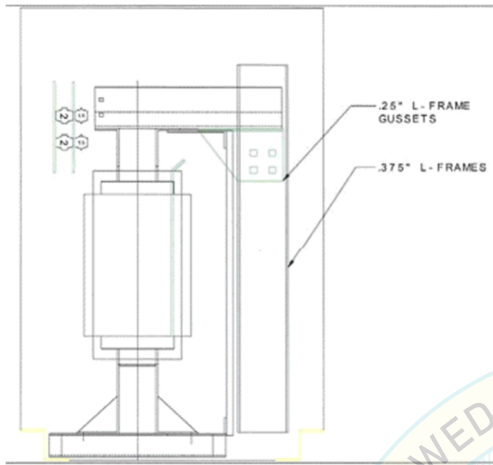


Building Code	Test Criteria	S _{DS} (g)	z/h	I _p	Horizontal		Vertical	
					A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2019	ICC-ES AC 156	0.37	1.0	1.5	0.59	0.44	0.25	0.10
Natural Frequencies (Hz)				Test Results				
F-B	S-S	V	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during testing.					
9.1	16.0	32.0						

OSP APPLICATION
Hitachi Power Grids – Dry Type Transformers
III. UUT Summary Sheets

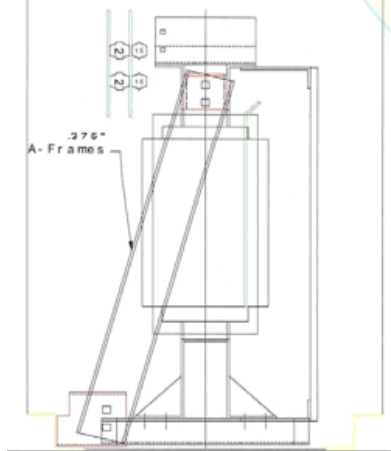
Date: 3/11/2021

UUT3B – Configuration B:



Building Code	Test Criteria	S_{Ds} (g)	z/h	I_p	Horizontal		Vertical	
					A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019	ICC-ES AC 156	1.35	1.0	1.5	2.16	1.62	0.90	0.36
Natural Frequencies (Hz)					Test Results			
F-B	S-S	V	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during testing.					
16.0	17.0	27.0						

UUT3D - Configuration D:



Building Code	Test Criteria	S_{Ds} (g)	z/h	I_p	Horizontal		Vertical	
					A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2019	ICC-ES AC 156	3.00	1.0	1.5	4.80	3.60	2.01	0.80
Natural Frequencies (Hz)					Test Results			
F-B	S-S	V	The UUT maintained structural integrity and functionality after the AC156 test. UUT full of contents during testing.					
8.6	27.0	32.0						