



OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION

APPLICATION FOR OSHPD SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY
APPLICATION #: OSP - 0400 - 10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: [ ] New [X] Renewal

Manufacturer Information

Manufacturer: Industrial Electric Mfg.

Manufacturer's Technical Representative: Ashok Kulkarni

Mailing Address: 48205 Warm Springs Blvd., Fremont, CA 94539

Telephone: 510-656-1600 Email: ashok.kulkarni@iemfg.com

Product Information

Product Name: 5-38kV Switchgear

Product Type: MV Switchgear

Product Model Number: See Certified Product Table attached
(List all unique product identification numbers and/or part numbers)

General Description: 38kV Switchgear NEMA 1 Indoor and NEMA 3R Outdoor Sections, 15kV Switchgear NEMA 1 Indoor Sections. Seismic
enhancements made to the test units and modifications required to address anomalies observed during the tests shall be incorporated into the production units.

Mounting Description: Rigidly floor mounted

Applicant Information

Applicant Company Name: Industrial Electric Mfg.

Contact Person: Ashok Kulkarni

Mailing Address: 48205 Warm Springs Blvd., Fremont, CA 94539

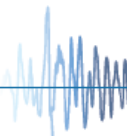
Telephone: 510-656-1600 Email: ashok.kulkarni@iemfg.com

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: [Handwritten Signature] Date: 8/28/2017

Title: Vice President of Engineering Company Name: Industrial Electric Mfg.

\*Access to Safe, Quality Healthcare Environments that Meet California's Diverse and Dynamic Needs\*





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

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

Company Name: Forell/Elsesser Engineers, Inc.

Name: Marco Scanu, SE California License Number: S4454

Mailing Address: 160 Pine St., 6<sup>th</sup> Flr., San Francisco, CA 94111

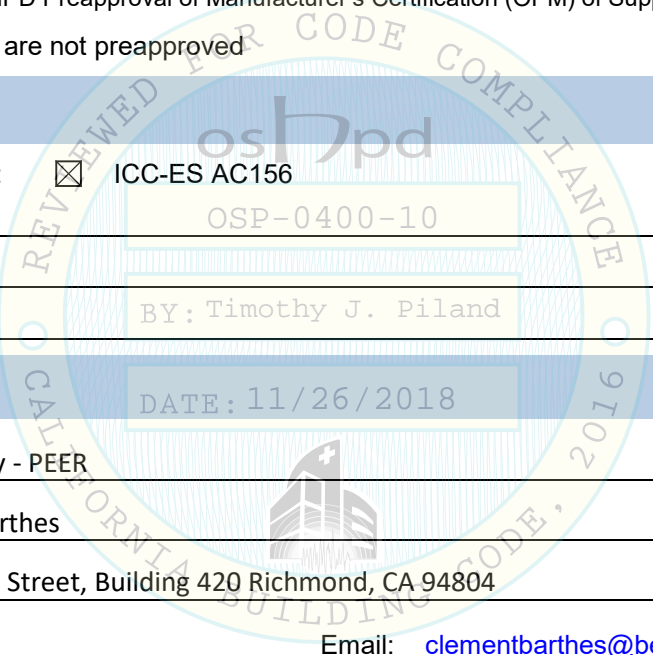
Telephone: (415) 837-0700 Email: [m.scanu@forell.com](mailto:m.scanu@forell.com)

**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): \_\_\_\_\_



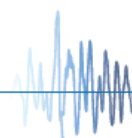
**Testing Laboratory**

Company Name: UC Berkeley - PEER

Contact Name: Clément Barthes

Mailing Address: 1301 S. 46<sup>th</sup> Street, Building 420 Richmond, CA 94804

Telephone: 510-665-3409 Email: [clementbarthes@berkeley.edu](mailto:clementbarthes@berkeley.edu)





**OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT  
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**Seismic Parameters**

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

Design Basis of Equipment or Components ( $F_p/W_p$ ) = 1.54

$S_{DS}$  (Design spectral response acceleration at short period, g) = 2.05

$a_p$  (In-structure equipment or component amplification factor) = 2.5

$R_p$  (Equipment or component response modification factor) = 6.0

$\Omega_0$  (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, UUT Summary Sheets

Overall dimensions and weight (or range thereof) = See attachment, Certified Products Table

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) = \_\_\_\_\_

$\Omega_0$  (System overstrength factor) = BY: Timothy J. Piland

$C_d$  (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): Certified Products Table, Certified Subcomponents Table, UUT Summary Sheets

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

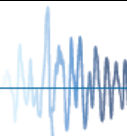
Signature:  Date: November 26, 2018

Print Name: Timothy J. Piland Title: SSE

Special Seismic Certification Valid Up to :  $S_{DS}$  (g) = 2.05  $z/h$  = 1

Condition of Approval (if applicable): \_\_\_\_\_

\_\_\_\_\_

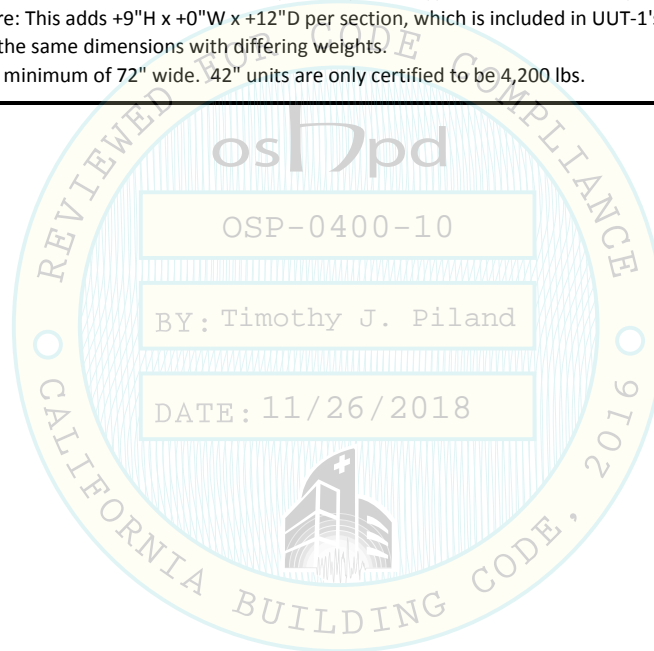


**IEM 5-38 kV Switchgear  
I. Certified Products Table**

Description	Height <sup>1</sup> (in)	Width <sup>2</sup> per section (in)	Depth (in)	Max. Weight per section (lbs)	NEMA Rating <sup>3</sup>	Test Status
5-15 kV - 1200A - 3000A	91.5	72	98	4,200 - 7,500 lbs	Type 1, 3R	Extrapolated <sup>5</sup>
15 kV - 097950-0002- 3000A	91.5	72	98	6,000 lbs	Type 1	UUT-4 <sup>5</sup>
15 kV - 097950-0001- 2000A	96	72	98	7,500 lbs	Type 1	UUT-3 <sup>5</sup>
IEM-38KV-SWGR-NEMA 1 - 2000A	95	42	123	4,200 lbs	Type 1	UUT-2 <sup>5</sup>
38 kV - 1200A - 3000A	95	84	123	4,200 lbs	Type 1, 3R	Interpolated
IEM-38KV-SWGR-NEMA 3R - 1200A	107	84	123	10,500 lbs	Type 3R	UUT-1 <sup>4</sup>
IEM-38KV-SWGR-NEMA 3R - 1200A-2000A	107	84	123	10,500 lbs	Type 3R	Extrapolated
IEM-15KV-SWGR-NEMA 3R - 1200A-3000A	107	84	123	10,500 lbs	Type 3R	Extrapolated

**Notes**

- Height shown does not include optional 4"-high steel channel under base of unit.
- 72" & 84"-wide units consist of (2) 36" or (2) 42"-wide sections, respectively in the typical breaker+auxiliary configuration.
- NEMA-3R includes walk-in enclosure: This adds +9"H x +0"W x +12"D per section, which is included in UUT-1's dimensions.
- UUT1 consisted of two sections of the same dimensions with differing weights.
- 36" wide units must be ganged to a minimum of 72" wide. 42" units are only certified to be 4,200 lbs.



**IEM 5-38kV Switchgear**  
**II. Certified Subcomponents Table**

Internal Components	Manufacturer	Part #	Testing Status
<b>Digital Relay</b>			
SEL-311 Differential and Distance Protection Relay	Schweitzer	0311LXXB4	Extrapolated
SEL-351A Protection Relay	Schweitzer	0351AXXB4	Extrapolated
SEL-387 Current Differ. And Overcurrent Relay	Schweitzer	0387XXB4	Extrapolated
SEL-451 Protection Relay	Schweitzer	045144151XXB4	UUT-1
SEL-487B Bus Differential Protection Relay	Schweitzer	0487BXXB4	Interpolated
SEL-501 Overcurrent Relay	Schweitzer	0501XXB4	Interpolated
SEL-751A Feeder Protection Relay	Schweitzer	0751AXXB4	Interpolated
SEL-751A Feeder Protection Relay	Schweitzer	SEL-751- A02COX0X7185	UUT-4
SEL-787 Transformer Differential Relay	Schweitzer	0787EX1A1A0X	UUT-1
BE1 Voltage Protective Relay	Basler	BE1-27-A3E-E1J	UUT-2
BE1 Current Differential Protective Relay	Basler	BE1-CDS240-0N5F	Interpolated
BE1 Overcurrent Protection System	Basler	BE1-951-B3ED0N1F	Interpolated
BE1 Bus Differential Relay	Basler	BE1-87B-ED0N1F	Interpolated
BE1 Under/Over Frequency Protective Relay	Basler	BE1-81O/U-XXX	Interpolated
BE1 Directional Power Relay	Basler	BE1-32R-B3ED1PA	UUT-2
BE1 Overcurrent Relay	Basler	BE1-51K1E210A2C6F	UUT-3
<b>Power Monitors/Meters</b>			
Power Monitor 3000	Allen Bradley	1404-M405A-ENT	UUT-1
GE Electronic Power Monitor (EPM) 5300P	GE	PL53002A0A00	Extrapolated
GE Electronic Power Monitor (EPM) 783	GE	783X9011001	UUT-2
GE Electronic Meter	GE	783X901001	UUT-2
SEL-734 Advanced Metering System	Schweitzer	0734009V1D11	UUT-1
SEL-735 Power Quality and Revenue Meter	Schweitzer	735BX00944CXXXXX16102XX	UUT-3
Powerlogic ION 7330 Power Meter	Square D	S7330A0B0B0A	UUT-2
SQD Power Meter	Square D	PM-870	UUT-4
<b>Switches</b>			
FT1 Test Switch 6 Pole	ABB	FT129A516G01	UUT-1
24 Control Switch	Electroschwitch	24202D	UUT-1, UUT-2, UUT-4
20 Rotary Switch	Electroschwitch	20KC-1101A8	UUT-3
<b>Indicating Light</b>			
Heavy Duty Indicating Light Red	GE	CR104PLT93R	UUT-1, UUT-2
Heavy Duty Indicating Light Green	GE	CR104PLT93G	UUT-1, UUT-2
<b>Power Components</b>			
Potential Transformer	ABB	1VLT5212003507	UUT-1
15kVA Transformer	IEM	89067-AFP-CT	UUT-1
PT Rollout Truck	IEM	IEM-SIEMENS-PT-ROLLOUT-TRUCK	UUT-3
CPT Rollout Truck	IEM	IEM-SIEMENS-CPT-ROLLOUT-TRUCK	UUT-3
Fuse Rollout Truck	IEM	IEM-SIEMENS-FUSE-ROLLOUT-TRUCK	UUT-4
Current Transformer	ITI	785-202	UUT-1
	ITI	785-122MR	UUT-2
15 kV 1200A Vacuum Breaker	Siemens	SIEMENS-15 kV-1200A	UUT-3
15 kV 2000A Vacuum Breaker	Siemens	SIEMENS-15 kV-2000A	UUT-3
15 kV 3000A Vacuum Breaker	Siemens	SIEMENS-15 kV-3000A	UUT-4
38kV 1200A Vacuum Breaker	Innovative Power Technologies	VVAG-38140MABB	UUT-2
38kV 2000A Vacuum Breaker		VVAG-38240M-ABBBBBA	UUT-1

**Test Report 2014-08 – UUT 1**

NEMA 3R Outdoor Unit – 2000A  
 Cold Formed Carbon Steel  
 Total weight and dimensions:  
 84”W x 123”D x 107”H, 10,500 lbs  
 Floor mounted w/: (10) – 1/2” Gr. 5 bolts



Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2016	ICC-ES AC 156	2.13	1	3.41g	2.56g	1.43g	0.57g
<b>Natural Frequencies</b>				<b>Test Results</b>			
<b>F-B</b>	<b>S-S</b>	<b>V</b>	The UUT maintained structural integrity and functionality after the AC156 test.				
10.2 Hz	4.7 Hz	14.3 Hz					
				The unit was full of content during testing.			

Internal Components	Manufacturer	Part #
SEL-451 Protection Relay	Schweitzer	045144151XXB4
SEL-787 Transformer Differential Protection Relay	Schweitzer	0787EX1A1A0X75850200
Power Monitor 3000	Allen Bradley	1404-M405A-ENT
SEL-734 Advanced Metering System	Schweitzer	0734009V1D11
FT1 Test Switch 6 Pole	ABB	FT129A516G01
Heavy Duty Indicating Light Red	GE	CR104PLT93R
Heavy Duty Indicating Light Green	GE	CR104PLT93G
38kV 2000A Vacuum Breaker	Innovative Power Technologies	VVAG-38240M-ABBBBBBA
Potential Transformer	ABB	1VLT5212003507
15kVA Transformer	IEM	89067-AFP-CT
Current Transformer	ITI	785-202
Control Switch	Electroswitch	24202D

**Test Report 2014-08 – UUT 2**

NEMA 1 Indoor Unit – 3000A  
 Cold Formed Carbon Steel  
 42"W x 123"D x 95"H, 4,200 lbs  
 Floor mounted w/: (19) – 1/2" Gr. 5 bolts

Tested twice:

Setup B – bottom plates in place

Setup C – bottom plates removed

**Note that bottom plates are optional.**



BY: Timothy J. Piland

Building Code	Test Criteria	S <sub>Ds</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2016	ICC-ES AC 156	2.05	1	3.28g	2.46g	1.37g	0.55g
<b>Natural Frequencies*</b>				<b>Test Results</b>			
<b>F-B</b>	<b>S-S</b>	<b>V</b>	The UUT maintained structural integrity and functionality after the AC156 test.				
7.5 Hz	14.1 Hz	>33 Hz					
*as measured in Setup B			The unit was full of content during testing.				

Internal Components	Manufacturer	Part #
BE-127 Voltage Relay	Basler	BE1-27-A3E-E1J
BE1-32R Directional Power Relay	Basler	BE1-32R-B3ED1PA
Powerlogic ION 7330 Power Meter	Square D	S7330A0B0B0A
KVV2C Electronic Switchboard Meter	GE	783X901001
Heavy Duty Indicating Light Red	GE	CR104PLT93R
Heavy Duty Indicating Light Green	GE	CR104PLT93G
38kV 1200A Vacuum Breaker	Innovative Power Technologies	VVAG-38140MABB
Current Transformer	ITI	785-122MR
Control Switch	Electroswitch	24202D

**Test Report 2017-18 – UUT 3**

NEMA 1 Indoor Unit  
 Cold Formed Carbon Steel  
 98”W x 72”D x 96”H, 7,500 lbs  
 Floor mounted w/: (18) – 1/2” Gr. 5 bolts



Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2016	ICC-ES AC 156	2.13	1	3.41g	2.56g	1.43g	0.57g
<b>Natural Frequencies</b>			<b>Test Results</b>				
<b>F-B</b>	<b>S-S</b>	<b>V</b>	The UUT maintained structural integrity and functionality after the AC156 test.				
15.2 Hz	10.6 Hz	>33 Hz					
			The unit was full of content during testing.				

Internal Components	Manufacturer	Part #
2000A Circuit breaker	Siemens	SIEMENS-15 kV-2000A
1200A Circuit breaker	Siemens	SIEMENS-15 kV-1200A
PT Rollout Truck	IEM	IEM-SIEMENS-PT-ROLLOUT-TRUCK
CPT Rollout Truck	IEM	IEM-SIEMENS-CPT-ROLLOUT-TRUCK
ON/OFF Switch	Electroswitch	20KC-1101A8
BE1 Overcurrent Relay	Basler	BE1-51K1EZ10A2C6F
SEL-735 Power Quality and Revenue Meter	Schweitzer	735BX00944CXXXXXX16102XX



**Test Report 2017-18 – UUT 4**  
 NEMA 1 Indoor Unit  
 Cold Formed Carbon Steel  
 98”W x 72”D x 92”H, 6,000 lbs  
 Floor mounted w/: (12) – 1/2” Gr.  
 5 bolts



Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2016	ICC-ES AC 156	2.13	1	3.41g	2.56g	1.43g	0.57g
<b>Natural Frequencies</b>				<b>Test Results</b>			
<b>F-B</b>	<b>S-S</b>	<b>V</b>	The UUT maintained structural integrity and functionality after the AC156 test.				
13.5 Hz	12.1Hz	>33 Hz					
				The unit was full of content during testing.			

Internal Components	Manufacturer	Part #
3000A Circuit breaker	Siemens	SIEMENS-15 kV-3000A
Fuse Rollout Truck	IEM	IEM-SIEMENS-FUSE-ROLLOUT-TRUCK
Breaker Switch	Electroswitch	24202D- 24
SEL-751A Feeder Protection Relay	Schweitzer	SEL-751- A02C0X0X7185
Power Meter	Schneider Electric	PM-870