



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

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

OFFICE USE ONLY

APPLICATION #: **OSP – 0021 – 10**

**OSHPD Special Seismic Certification Preapproval (OSP)**

Type:  New  Renewal

**Manufacturer Information**

Manufacturer: Industrial Electric Mfg.

Manufacturer's Technical Representative: Ashok Kulkarni

Mailing Address: 48205 Warm Springs Blvd., Fremont, CA 94536

Telephone: (510) 360-1247 Email: [ashokk@iemfg.com](mailto:ashokk@iemfg.com)

**Product Information**

Product Name: IEM LV/MV Switchgear & PIE/PIU Panels

Product Type: IEM Switchgear & Panels

Product Model Number: Low and Medium Voltage Switchgear & PIU/PIE Panels  
(List all unique product identification numbers and/or part numbers)

General Description: Low & medium voltage switchgear in NEMA Type 1 or 3R (non-walk-in) enclosures; PIU & PIE  
Panels in NEMA Type 1 or 3R enclosures. Switchgear and panels have a variety of voltage and amp ratings.

Mounting Description: The PIU and PIE panels are rigidly wall mounted while the Low and Medium Voltage  
Switchgear are rigidly floor mounted.

**Applicant Information**

Applicant Company Name: Industrial Electric Mfg.

Contact Person: Ashok Kulkarni

Mailing Address: 48205 Warm Springs Blvd., Fremont, CA 94536

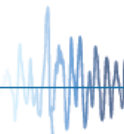
Telephone: (510) 360-1247 Email: [ashokk@iemfg.com](mailto:ashokk@iemfg.com)

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:  Date: 8/25/2016

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  
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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, 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

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

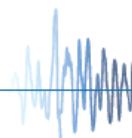
**Testing Laboratory**

Company Name: Southwest Research Institute

Contact Name: Mark Orłowski

Mailing Address: 6220 Culebra Road, San Antonio, TX 78238

Telephone: (210) 522-2624 Email: Mark.orłowski@swri.org





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FACILITIES DEVELOPMENT DIVISION**

**Seismic Parameters**

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

Design Basis of Equipment or Components ( $F_p/W_p$ ) = Refer to attached "Certified Product Table"

$S_{DS}$  (Design spectral response acceleration at short period, g) = Refer to attached "Certified Product Table"

$a_p$  (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) = \_\_\_\_\_

$C_d$  (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**

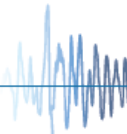
Signature:  Date: 11/04/2016

Print Name: M. R. Karim Title: SHFR

Special Seismic Certification Valid Up to :  $S_{DS}$  (g) = See Above  $z/h$  = 1.0

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

\_\_\_\_\_  
\_\_\_\_\_



**Industrial Electric Mfg. - LV & MV Switchgear and Panels**

**I. Certified Product Table**

Unit	Width	Depth	Max Height	Max. Service Weight	Construction Material <sup>1</sup>	S <sub>DS</sub>	F <sub>P</sub> /W <sub>P</sub>	Model Number	Notes	Test Status
<b>Low Voltage Switchgear</b>										
Auxiliary Section	12"	22"	69"	180 lbs	7 & 12 GA CRS	2.41	1.82	IEM LV Switchgear	2	Rpt. 18.18135.06 - UUT7
Tie Section	24"	22"	69"	420 lbs	7 & 12 GA CRS	2.41	1.82	IEM LV Switchgear	2	Rpt. 18.18135.06 - UUT6
Distributed Section	38"	42"	91.5"	960 lbs	7 & 12 GA CRS	2.41	1.82	IEM LV Switchgear	2	Rpt.18.18116.14 - UUT2
Main/Tie/Distributed/Auxiliary Section	12"-42"	12"-42"	91.5"	2,500 lbs	7 & 12 GA CRS	2.41	1.82	IEM LV Switchgear	2	Interpolated
Main Section	42"	42"	91.5"	2,500 lbs	7 & 12 GA CRS	2.41	1.82	IEM LV Switchgear	2	Rpt. 18.18.116.14 - UUT1
Main/Tie/Distributed/Auxiliary Section	12"-42"	12"-46"	94.5"	2,750 lbs	7 & 12 GA CRS	2.41	1.82	IEM LV Switchgear	2	Extrapolated
<b>Medium Voltage Switchgear</b>										
Main Section	30"	32"	74"	700 lbs	7 & 12 GA CRS	2.03	1.52	IEM MV Switchgear	2	Rpt. 18.18135.06 - UUT8
Main Section	30"-38"	32"-54"	94"	1,290 lbs	7 & 12 GA CRS	2.03	1.52	IEM MV Switchgear	2	Interpolated
Main Section	38"	54"	94"	1,290 lbs	7 & 12 GA CRS	2.03	1.52	IEM MV Switchgear	2	Rpt. 18.18135.01 - UUT5
Main Section	30"-42"	32"-59"	97"	1,420 lbs	7 & 12 GA CRS	2.03	1.52	IEM MV Switchgear	2	Extrapolated
<b>Panels</b>										
PIU Panel	20"	7"	69"	220 lbs	12 GA CRS	2.67	2.00	IEM PIU/PIE Panel	3	Rpt. 18.18116.14 - UUT3
PIU & PIE Panel	20"	6"-7"	78"	250 lbs	12 GA CRS	2.67	2.00	IEM PIU/PIE Panel	3	Interpolated
PIE Panel	20"	7"	78"	250 lbs	12 GA CRS	2.67	2.00	IEM PIU/PIE Panel	3	Rpt. 18.18116.14 - UUT4
PIU & PIE Panel	20"-22"	6"-7"	81"	275 lbs	12 GA CRS	2.67	2.00	IEM PIU/PIE Panel	3	Extrapolated

**Notes**

1. All units are available in NEMA Type 1 and 3R enclosures. CRS = ASTM-A-1011-00-CS TYPE B/SAE-1008 Cold Rolled Carbon Steel
2. Floor mounted
3. Wall mounted

**Industrial Electric Mfg. - LV & MV Switchgear and Panels**  
**II. Certified Subcomponents Table**

LOW VOLTAGE SWITCHGEAR

Internal Components	Manufacturer	Part #	Testing Status
GE Entelliguard Breaker 5000A	GE	GA50M1	UUT1
GE Entelliguard Breaker 3200A	GE	GA32M1	UUT1
GE Entelliguard Breaker 2000A	GE	GA20M1	UUT2
GE Entelliguard Breaker 800A	GE	GA08M1	UUT6
Square D MasterPact NW 5000A	Schneider Electric	YA5LLR	UUT1
Square D MasterPact NW 800A	Schneider Electric	WA5EER	UUT2,7
Square D MasterPact NW 2000A	Schneider Electric	WA5FFR	UUT2
GE Spectra Breaker 1200A	GE	SKL-1200A	UUT2
GE Spectra Breaker 600A	GE	SGL-600A	UUT6
ABB Emax 2 Breaker 5000A	ABB	Z6LKUS	UUT6
ABB Emax 2 Breaker 2000A	ABB	12VFUK	UUT1
ABB Emax 2 Breaker 800A	ABB	11VDUF	UUT1
Schweitzer Protective Relay	Schweitzer	IEM-SEL-PROT-RELAY	UUT1
Power meter	Square D	ION-8650	UUT1,2
Illuminated Pilot Light Realy	IEM	IEM-ILL-PB	UUT1
Illuminated Push Button Relay	IEM	IEM-LED-PILOT	UUT1
Push Button	IEM	IEM-PB	UUT1,2
Breaker Control Switch	IEM	IEM-BKR-CRTL-SW	UUT1
LED RED	IEM	IEM-LED-RED	UUT1
LED GREEN	IEM	IEM-LED-GRN	UUT1

MEDIUM VOLTAGE SWITCHGEAR

Internal Components	Manufacturer	Part #	Testing Status
Load Interrupter Switch, 15 kV, 1200A	Powercon	PIF-L-1200	UUT5
Load Interrupter Switch, 15 kV, 600A	Powercon	PIF-L-600	UUT8
Load Interrupter Switch, 15 kV 1200A	ABB	244-040	UUT5
Load Interrupter Switch, 15 kV 600A	ABB	244-042	UUT8
Power Meter	Square D	ION-8650	UUT5
Fuse 1200A, 15 kV	IEM	IEM-LI-FUSE-1200A	UUT5
Fuse 600A, 15 kV	IEM	IEM-LI-FUSE-600A	UUT8
Infra-red Viewing Window	IEM	IEM-IR-WINDOW	UUT5
LED RED	IEM	IEM-LED-RED	UUT5&8
LED GREEN	IEM	IEM-LED-GRN	UUT5&8

**Industrial Electric Mfg. - LV & MV Switchgear and Panels**  
**II. Certified Subcomponents Table**

PIE PANEL

<b>Internal Components</b>	<b>Manufacturer</b>	<b>Part #</b>	<b>Testing Status</b>
GE Spectra Breaker	GE	SGL-600A	UUT4
GE Branch Breaker	GE	THHQ-15A	UUT4
GE Branch Breaker	GE	THHQ-30A	UUT4
GE Branch Breaker	GE	THHQ-50A	UUT4
GE Branch Breaker	GE	THHQ-100A	UUT4
GE Branch Breaker	GE	TEYL-50A	UUT4
GE Branch Breaker	GE	TEYL-125A	UUT4
GE Branch Breaker	GE	SEL-150A	UUT4
GE Branch Breaker	GE	TJJ-225A	UUT4
Siemens Main Breaker	Siemens	JXD6-400A	UUT4
Siemens Branch Breaker	Siemens	ED4-50	UUT4
Siemens Branch Breaker	Siemens	ED4-100	UUT4

PIU PANEL

<b>Internal Components</b>	<b>Manufacturer</b>	<b>Part #</b>	<b>Testing Status</b>
GE Spectra Breaker	GE	SFL-400A	UUT3
GE Branch Breaker	GE	TQD-15A	UUT3
GE Branch Breaker	GE	TQD-30A	UUT3
GE Branch Breaker	GE	TQD-50A	UUT3
GE Branch Breaker	GE	TQD-100A	UUT3
GE Branch Breaker	GE	THQD-50A	UUT3
GE Branch Breaker	GE	THQD-100A	UUT3
GE Branch Breaker	GE	TEY-125A	UUT3
GE Branch Breaker	GE	TEY-70A	UUT3
GE Branch Breaker	GE	TEY-30A	UUT3

OSP APPLICATION  
Industrial Electric Mfg. – LV & MV Switchgear and Panels  
III. UUT Summary Sheets

Date: 8/30/2016

**Test Report 18.18116.14 – UUT 1&2**

LV Switchgear Main Section - UUT1 (shown Left)  
 LV Switchgear Distribution Section - UUT2 (shown Right)  
 7 GA CRS for base of switchgear and 12 GA CRS for enclosure  
 42"W x 42"D x 91.5"H, 2,500 lbs - UUT1  
 38"W x 42"D x 91.5"H, 960 lbs - UUT2  
 UUT1 & 2 were attached and tested together  
 Floor mounted using: (8) - 5/8" bolts



Figure 4-1: IEM Low Voltage Switchgear

Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-H</sub> (g)
CBC 2016	ICC-ES AC 156	2.41	1	3.86	2.91	1.61	0.64
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.				
3.94	4.13	15.81					

UUT1		
Subcomponents	Manufacturer	Part #
GE Entelliguard Breaker 5000A	GE	GA50M1
GE Entelliguard Breaker 3200A	GE	GA32M1
Square D MasterPact NW 5000A	Schneider Electric	YA5LLR
ABB Emax 2 Breaker 2000A	ABB	12VFUK
ABB Emax 2 Breaker 800A	ABB	11VDUF
Schweitzer Protective Relay	Schweitzer	IEM-SEL-PROT-RELAY
Power meter	Square D	ION-8650
Illuminated Pilot Light Relay	IEM	IEM-ILL-PB
Illuminated Push Button Relay	IEM	IEM-LED-PILOT
Push Button	IEM	IEM-PB
Breaker Control Switch	IEM	IEM-BKR-CRTL-SW
LED RED	IEM	IEM-LED-RED
LED GREEN	IEM	IEM-LED-GRN

UUT2		
Subcomponents	Manufacturer	Part #
GE Entelliguard Breaker 2000A	GE	GA20M1
Square D MasterPact NW 800A	Schneider Electric	WA5EER
Square D MasterPact NW 2000A	Schneider Electric	WA5FFR
GE Spectra Breaker 1200A	GE	SKL-1200A
Push Button	IEM	IEM-PB
Illuminated Pilot Light Relay	IEM	IEM-ILL-PB

OSP APPLICATION  
Industrial Electric Mfg. – LV & MV Switchgear and Panels  
III. UUT Summary Sheets

Date: 8/30/2016

**Test Report 18.18116.14 – UUT 3&4**

PIU Panel - UUT3 (Shown Right)

PIE Panel – UUT4 (Shown Left)

7 GA CRS for base of switchgear and 12 GA CRS for enclosure

20"W x 7"D x 69"H, 220 lbs - UUT3

20"W x 7"D x 78"H, 250 lbs - UUT4

UUT3 & 4 were tested together

Wall mounted using: (6) - 5/8" bolts each unit



Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-H</sub> (g)
CBC 2016	ICC-ES AC 156	2.67	1	4.27	3.20	1.79	0.71
<b>Natural Frequencies (Hz)</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. UUT full of contents during testing.				
N/A	N/A	N/A					

UUT3		
Subcomponents	Manufacturer	Part #
GE Spectra Breaker	GE	SFL-400A
GE Branch Breaker	GE	TQD-15A
GE Branch Breaker	GE	TQD-30A
GE Branch Breaker	GE	TQD-50A
GE Branch Breaker	GE	TQD-100A
GE Branch Breaker	GE	THQD-50A
GE Branch Breaker	GE	THQD-100A
GE Branch Breaker	GE	TEY-125A
GE Branch Breaker	GE	TEY-70A
GE Branch Breaker	GE	TEY-30A

UUT4		
Subcomponents	Manufacturer	Part #
GE Spectra Breaker	GE	SGL-600A
GE Branch Breaker	GE	THHQ-15A
GE Branch Breaker	GE	THHQ-30A
GE Branch Breaker	GE	THHQ-50A
GE Branch Breaker	GE	THHQ-100A
GE Branch Breaker	GE	TEYL-50A
GE Branch Breaker	GE	TEYL-125A
GE Branch Breaker	GE	SEL-150A
GE Branch Breaker	GE	TJJ-225A
Siemens Main Breaker	Siemens	JXD6-400A
Siemens Branch Breaker	Siemens	ED4-50
Siemens Branch Breaker	Siemens	ED4-100



**Test Report 18.18135.01 – UUT 5**  
 Medium Voltage Switchgear  
 7 GA CRS for base of switchgear and  
 12 GA CRS for enclosure  
 38"W x 54"D x 94"H, 1,290 lbs  
 Floor mounted using: (6) – 12mm bolts



*Figure 1-10: IEM Medium Voltage Switchgear Mounted to Earthquake Simulator for Vertical Vibration*

Building Code	Test Criteria	S <sub>Ds</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-H</sub> (g)
CBC 2016	ICC-ES AC 156	2.03	1	3.25	2.44	1.36	0.54
<b>Natural Frequencies (Hz)</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. UUT full of contents during testing.				
14.26	7.95	46.7					

<b>UUT5</b>		
Subcomponents	Manufacturer	Part #
Load Interrupter Switch, 15 kV, 1200A	Powercon	PIF-L-1200
Load Interrupter Switch, 15 kV 1200A	ABB	244-040
Fuse 1200A. 15 kV	IEM	IEM-LI-FUSE-1200A
Power Meter	Square D	ION-8650
Infra-red Viewing Window	IEM	IEM-IR-WINDOW
LED RED	IEM	IEM-LED-RED
LED GREEN	IEM	IEM-LED-GRN

OSP APPLICATION  
 Industrial Electric Mfg. – LV & MV Switchgear and Panels  
 III. UUT Summary Sheets

Date: 8/30/2016

**Test Report 18.18135.06 – UUT 6&7**

Lower Voltage Switchgear Tie Section – UUT 6 (shown left)  
 Lower Voltage Switchgear Auxiliary Section – UUT 7 (shown right)  
 7 GA CRS for base of switchgear and 12 GA CRS for enclosure  
 24”W x 22”D x 69”H, 420 lbs – UUT6  
 12”W x 22”D x 69”H, 180 lbs – UUT7  
 UUT6 & 7 were attached and tested together  
 Floor mounted using: (8) - 5/8” bolts



Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-H</sub> (g)
CBC 2016	ICC-ES AC 156	2.41	1	3.86	2.91	1.61	0.64
<b>Natural Frequencies (Hz)</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. UUT full of contents during testing.				
11.7	13.21	47.0					

<b>UUT6</b>		
Subcomponents	Manufacturer	Part #
GE Entelliguard Breaker 800A	GE	GA08M1
GE Spectra Breaker 600A	GE	SGL-600A
ABB Emax 2 Breaker 5000A	ABB	Z6LKUS

<b>UUT7</b>		
Subcomponents	Manufacturer	Part #
Square D MasterPact NW 800A	Schneider Electric	WA5EER

**Test Report 18.18135.06 – UUT 8**

Medium Voltage Switchgear  
 7 GA CRS for base of switchgear and 12 GA CRS for enclosure  
 30"W x 32"D x 74"H, 700 lbs  
 Floor mounted using: (6) - 5/8" bolts



Building Code	Test Criteria	S <sub>Ds</sub> (g)	z/h	Horizontal		Vertical	
				A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-H</sub> (g)
CBC 2016	ICC-ES AC 156	2.03	1	3.25	2.44	1.36	0.54
<b>Natural Frequencies (Hz)</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. UUT full of contents during testing.				
9.30	9.51	45.3					

<b>UUT8</b>		
<b>Subcomponents</b>	<b>Manufacturer</b>	<b>Part #</b>
Load Interrupter Switch, 15 kV, 600A	Powercon	PIF-L-600
Load Interrupter Switch, 15 kV 600A	ABB	244-042
Fuse 600A, 15 kV	IEM	IEM-LI-FUSE-600A
LED RED	IEM	IEM-LED-RED
LED GREEN	IEM	IEM-LED-GRN