



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

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

OFFICE USE ONLY

APPLICATION #: **OSP – 0534-10**

OSHPD Special Seismic Certification Preapproval (OSP)

Type: New Renewal

Manufacturer Information

Manufacturer: Termaco

Manufacturer's Technical Representative: Carl Tremblay

Mailing Address: 325 Boul. Industriel, Saint-Jean-Sur-Richelieu, QC J3B 7M3, Canada

Telephone: (450) 346-6871 Email: ctremblay@termaco.com

Product Information

Product Name: TCR Battery Cabinets and TCL Landing Cabinets

Product Type: Battery cabinets for reserve power

Product Model Number: See Certified Product Table attached

(List all unique product identification numbers and/or part numbers)

General Description: Battery & landing cabinets. Seismic enhancements made to the UUTs and modifications required to address anomalies observed during the tests shall be incorporated into the production units.

Mounting Description: Rigidly Mounted to Floor

Applicant Information

Applicant Company Name: Termaco

Contact Person: Carl Tremblay

Mailing Address: 325 Boul. Industriel, Saint-Jean-Sur-Richelieu, QC J3B 7M3 CA

Telephone: (450) 346-6871 Email: ctremblay@termaco.com

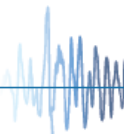
I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2016.

Signature of Applicant: 

Date: 7/24/2017

Title: R&D Director Company Name: Termaco

"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., 6th 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): _____

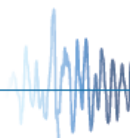
Testing Laboratory

Company Name: NTS Huntsville

Contact Name: Tom Boonarkat

Mailing Address: 7800 Highway 20 West, Huntsville, AL 35806

Telephone: (256) 716-4520 Email: Tom.boonarkat@nts.com





**OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
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) = 1.79

S_{DS} (Design spectral response acceleration at short period, g) = 2.38

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

R_p (Equipment or component response modification factor) = 6.0

Ω_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) = _____

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, 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

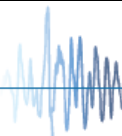
OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2022

Signature:  Date: 8/2/2017

Print Name: M. R. Karim Title: SHFR

Special Seismic Certification Valid Up to : S_{DS} (g) = 2.38 z/h = 1.0

Condition of Approval (if applicable): _____



Termaco - TCR Battery Cabinets and TCL Landing Cabinets

I. Certified Product Table

Unit	Width	Depth	Height	Max Weight	Model Number	Notes	Test Status
Battery Cabinets							
Battery Cabinet - 150A w/ 100Ah EnerSys & C&D batteries	30.11"	31.5"	82.67"	1280 lbs	TCR-CS-408RB-S06-150-CD100	1-5	EUT2A
Battery Cabinet - 150A w/ 100Ah EnerSys & C&D batteries (w/ floating hinges)	30.11"	31.5"	82.67"	1280 lbs	TCR-CS-408RB-S06-150-CD100	1-5	EUT2B
Battery Cabinet - 150A w/ 100Ah EnerSys batteries	30.11"	31.5"	82.67"	1280 lbs	TCR-CS-408RB-S06-150-EN100	1-4	Interpolated
Battery Cabinet - 150A w/ 100Ah C&D batteries	30.11"	31.5"	82.67"	1400 lbs	TCR-CS-408RB-S06-150-CD100	1-4	Interpolated
Battery Cabinet - 150A w/ 150Ah EnerSys batteries	30.11"	31.5"	82.67"	1750 lbs	TCR-CS-408RB-S06-150-EN150	1-4	Interpolated
Battery Cabinet - 150A w/ 150Ah C&D batteries	30.11"	31.5"	82.67"	1600 lbs	TCR-CS-408RB-S06-150-CD150	1-4	Interpolated
Battery Cabinet - 150A w/ 210Ah EnerSys batteries	30.11"	31.5"	82.67"	2100 lbs	TCR-CS-408RB-S06-150-EN205	1-4	Interpolated
Battery Cabinet - 150A w/ 210Ah C&D batteries	30.11"	31.5"	82.67"	2000 lbs	TCR-CS-408RB-S06-150-CD210	1-4	Interpolated
Battery Cabinet - 150A w/ 300Ah EnerSys batteries	30.11"	31.5"	82.67"	2700 lbs	TCR-CS-408RB-S05-150-EN300	1-4	Interpolated
Battery Cabinet - 150A w/ 300Ah C&D batteries	30.11"	31.5"	82.67"	2650 lbs	TCR-CS-408RB-S05-150-CD300	1-4	Interpolated
Battery Cabinet - 200A w/ 210Ah EnerSys batteries	30.11"	31.5"	82.67"	2100 lbs	TCR-CS-408RB-S06-200-EN205	1-4	Interpolated
Battery Cabinet - 200A w/ 210Ah C&D batteries	30.11"	31.5"	82.67"	2000 lbs	TCR-CS-408RB-S06-200-CD210	1-4	Interpolated
Battery Cabinet - 200A w/ 300Ah EnerSys batteries	39.37"	31.5"	82.67"	2700 lbs	TCR-CS-408RB-S05-200-EN300	1-4	Interpolated
Battery Cabinet - 200A w/ 300Ah C&D batteries	39.37"	31.5"	82.67"	2650 lbs	TCR-CS-408RB-S05-200-CD300	1-4	Interpolated
Battery Cabinet - 200A w/ 540Ah EnerSys batteries	39.37"	31.5"	82.67"	4160 lbs	TCR-CS-408RB-S05-200-EN540	1-4	Interpolated
Battery Cabinet - 200A w/ 540Ah C&D batteries	39.37"	31.5"	82.67"	4000 lbs	TCR-CS-408RB-S05-200-CD540	1-4	Interpolated
Battery Cabinet - 300A w/ 300Ah EnerSys batteries	39.37"	31.5"	82.67"	2700 lbs	TCR-CS-408RB-S05-300-EN300	1-4	Interpolated
Battery Cabinet - 300A w/ 300Ah C&D batteries	39.37"	31.5"	82.67"	2650 lbs	TCR-CS-408RB-S05-300-CD300	1-4	Interpolated
Battery Cabinet - 300A w/ 540Ah EnerSys batteries	39.37"	31.5"	82.67"	4160 lbs	TCR-CS-408RB-S05-300-EN540	1-4	Interpolated
Battery Cabinet - 300A w/ 540Ah C&D batteries	39.37"	31.5"	82.67"	4000 lbs	TCR-CS-408RB-S05-300-CD540	1-4	Interpolated
Battery Cabinet - 400A w/ 300Ah EnerSys batteries	39.37"	31.5"	82.67"	2700 lbs	TCR-CS-408RB-S05-400-EN300	1-4	Interpolated
Battery Cabinet - 400A w/ 300Ah C&D batteries	39.37"	31.5"	82.67"	2650 lbs	TCR-CS-408RB-S05-400-CD300	1-4	Interpolated
Battery Cabinet - 400A w/ 540Ah EnerSys batteries	39.37"	31.5"	82.67"	4160 lbs	TCR-CS-408RB-S05-400-EN540	1-4	Interpolated
Battery Cabinet - 400A w/ 540Ah C&D batteries	39.37"	31.5"	82.67"	3975 lbs	TCR-CS-408RB-S05-400-CD540	1-4	Interpolated
Battery Cabinet - 400A w/ 540Ah EnerSys & C&D Batteries	39.37"	31.5"	82.67"	4160 lbs	TCR-CS-408RB-S05-400-EN540	1-5	EUT1
Landing Cabinets							
1000A busbar and fuses, full harness	20"	32.7"	45"	370 lbs - 676 lbs	TCL-HS-2-20-1000-A-1778	1-3	EUT4
1000A, 1400A, 1800A, and 2000A bus bar and fuses, full harness	18"-20"	32.7"	45"-78.7"	370 lbs - 676 lbs	TCL-HS-X-18-1000-B-Y, TCL-HS-X-20-1000-B-Y, TCL-HS-X-18-1400-B-Y, TCL-HS-X-20-1400-B-Y, TCL-HS-X-18-1800-B-Y, TCL-HS-X-20-1800-B-Y, TCL-HS-X-18-2000-B-Y, TCL-HS-X-20-2000-B-Y	1-3,6,7	Interpolated
2000A busbar and fuses, full harness	20"	32.7"	45"-78.7"	676 lbs	TCL-CS-4-20-2000-S02-1778	1-3	EUT5
3000A, 3500A, and 4000A busbar and fuses, full harness	18"-20"	32.7"	45"-78.7"	676 lbs - 875 lbs	TCL-HS-X-18-3000-B-Y, TCL-HS-X-20-3000-B-Y, TCL-HS-X-18-3500-B-Y, TCL-HS-X-20-3500-B-Y, TCL-HS-X-18-4000-B-Y, TCL-HS-X-20-4000-B-Y	1-3,6,7	Interpolated
4000A busbar and fuses, full harness	18"	32.7"	78.7"	738 lbs	TCL-HS-4-18-4000-B-1778	1-3	EUT3

Notes

- All enclosures are manufactured by Termaco.
- All enclosures consist of 16ga cold-formed carbon steel (CFS) panels on a 10ga CFS frame and are NEMA-1 rated.
- All enclosures are rigidly mounted to the floor.
- All battery cabinets can optionally be refitted with floating hinges. S₅ rating does not change.
- Tested battery cabinets were modified to include both EnerSys and C&D batteries. The total number of batteries and A-h rating remained the same.
- "X" = Height Category 2, 3, or 4
- "Y" = 0891 or 1778. Version 0891 is delivered without fuses; version 1778 includes fuses.

Termaco - TCR Battery Cabinets and TCL Landing Cabinets
II. Certified Subcomponents Table

Internal Components	Manufacturer/Material	Part #	Testing Status
Busbar¹			
Busbar	Copper	LAN-CS-410RB-B-ANGLE-1000	EUT4
Busbar	Copper	LAN-CS-410RB-B-1000F	EUT4
Busbar	Copper	LAN-CS-410RB-B-1000	Interpolated
Busbar	Copper	LAN-CS-410RB-B-2000F	EUT5
Busbar	Copper	LAN-CS-410RB-B-2000	Interpolated
Busbar	Copper	LAN-CS-410RB-B-3000F	Interpolated
Busbar	Copper	LAN-CS-410RB-B-3000	Interpolated
Busbar	Copper	LAN-CS-410RB-B-4000	Interpolated
Busbar	Copper	LAN-CS-410RB-B-4000F	EUT3
Busbar	Copper	LAN-CS-410RB-B-ANGLE-2000	EUT3
Fuses			
Fuses	Mersen	A4BQ1000	EUT4
Fuses	Mersen	A4BQ1200	Interpolated
Fuses	Mersen	A4BQ1350	Interpolated
Fuses	Mersen	A4BQ1400	Interpolated
Fuses	Mersen	A4BQ1500	Interpolated
Fuses	Mersen	A4BQ1600	Interpolated
Fuses	Mersen	A4BQ1800	Interpolated
Fuses	Mersen	A4BQ1900	Interpolated
Fuses	Mersen	A4BQ2000	EUT5
Fuses	Mersen	A4BQ2500	Interpolated
Fuses	Mersen	A4BQ2501	Interpolated
Fuses	Mersen	A4BQ3000	Interpolated
Fuses	Mersen	A4BQ3500	Interpolated
Fuses	Mersen	A4BQ3800	Interpolated
Fuses	Mersen	A4BQ4000	EUT3
Batteries			
Batteries	C&D	UPS12-100MR	EUT2A & EUT2B
Batteries	C&D	UPS12-150MR	Interpolated
Batteries	C&D	UPS12-210MR	Interpolated
Batteries	C&D	UPS12-300MR	Interpolated
Batteries	C&D	UPS12-350MR	Interpolated
Batteries	C&D	UPS12-400MR	Interpolated
Batteries	C&D	UPS12-490MR	Interpolated
Batteries	C&D	UPS12-540MR	EUT1
Batteries	Enersys	12HX100	EUT2A & EUT2B
Batteries	Enersys	12HX150	Interpolated
Batteries	Enersys	12HX205	Interpolated
Batteries	Enersys	12HX300	Interpolated
Batteries	Enersys	12HX330	Interpolated
Batteries	Enersys	12HX400	Interpolated
Batteries	Enersys	12HX505	Interpolated
Batteries	Enersys	12HX540	EUT1
Breakers²			
150A	Square D	JLL37150D81AASO	EUT2A & EUT2B
200A	Square D	JLL37200D82AASO	Interpolated
300A	Square D	LLL37030D27AASO	Interpolated
400A	Square D	LLL37040D30AASO	EUT1

Notes

1. Busbars are C110 copper and conform to ASTM B133/B187.
2. JLL* and LLL* are identical in supplier and material and similar in construction and configuration.

OSP APPLICATION
 Termaco – TCR Battery Cabinets and TCL Landing Cabinets
 III. UUT Summary Sheets

Date: 7/24/2017

Test Report PR060339-TR-17 – EUT 1

Battery Cabinet – 30x 12HX540 and 2x UPS12-540MR

TCR-CS-408RB-S05-400-EN540

(Large Malibu Cabinet)

10 ga. Cold Form Steel frame and

16 ga. doors and side panels Cold Form Steel

39.37”W x 31.5”D x 82.67”H, 4,160 lbs

Floor mounted using: (6) - 1/2” Grade 5 bolts

This unit was modified by replacing two Enersys batteries with two C&D batteries of the same capacity.



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 156	2.38	1.0	1.5	3.81	2.86	1.59	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.					
6.5	7.1	>33.3						

Internal Components	Manufacturer/Material	Part #
Batteries	C&D	UPS12-540MR
Batteries	Enersys	12HX540
400A	Square D	LLL37040D30AASO

Termaco – TCR Battery Cabinets and TCL Landing Cabinets

III. UUT Summary Sheets

Test Report PR060339-TR-17 – EUT2A

Battery Cabinet – 30x UPS12-100MR and 2x 12HX100

TCR-CS-408RB-S06-150-CD100

(Small Malibu Cabinet)

10 ga. Cold Form Steel frame and

16 ga. doors and side panels Cold Form Steel

30.11"W x 31.5"D x 82.67"H, 1,280 lbs

Floor mounted using: (6) - 1/2" Grade 5 bolts



This unit was modified by replacing two C&D batteries with two
Energys batteries of the same capacity.

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 156	2.38	1.0	1.5	3.81	2.86	1.59	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.					
7	13	32						

Internal Components	Manufacturer/Material	Part #
Batteries	C&D	UPS12-100MR
Batteries	Energys	12HX100
150A	Square D	JLL37150D81AASO

Termaco – TCR Battery Cabinets and TCL Landing Cabinets

III. UUT Summary Sheets

Test Report PR060339-TR-17 – EUT2B

Battery Cabinet – 30x UPS12-100MR and 2x 12HX100

TCR-CS-408RB-S06-150-CD100

With floating hinges

(Small Malibu Cabinet)

10 ga. Cold Form Steel frame and

16 ga. doors and side panels Cold Form Steel

30.11”W x 31.5”D x 82.67”H, 1,280 lbs

Floor mounted using: (6) - 1/2” Grade 5 bolts

This unit was modified by replacing two C&D batteries with two
Energys batteries of the same capacity.



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 156	2.51	1.0	1.5	4.02	3.01	1.68	0.67
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	13	32						

Internal Components	Manufacturer/Material	Part #
Batteries	C&D	UPS12-100MR
Batteries	Energys	12HX100
150A	Square D	JLL37150D81AASO

Termaco – TCR Battery Cabinets and TCL Landing Cabinets

III. UUT Summary Sheets

Test Report PR056192-TR-17 – EUT3

Landing Cabinet – 4000A busbar and fuses, full harness

TCL-HS-4-18-4000-B-1778

(Termaco Landing Cabinet)

10 ga. Cold Form Steel frame and

16 ga. doors and side panels Cold Form Steel

18"W x 32.7"D x 78.7"H, 738 lbs

Floor mounted using: (6) - 1/2" Grade 5 bolts



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 156	2.38	1.0	1.5	3.81	2.86	1.59	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.					
15	8.2	>33.3						

Internal Components	Manufacturer/Material	Part #
Busbar	Copper	LAN-CS-410RB-B-4000F
Busbar	Copper	LAN-CS-410RB-B-ANGLE-2000
Fuses	Mersen	A4BQ4000

Termaco – TCR Battery Cabinets and TCL Landing Cabinets

III. UUT Summary Sheets

Test Report PR056192-TR-17 – EUT4

Landing Cabinet – 1000A busbar and fuses, full harness

TCL-HS-2-20-1000-A-1778

(Termaco Landing Cabinet)

10 ga. Cold Form Steel frame and

16 ga. doors and side panels Cold Form Steel

20"W x 32.2"D x 45"H, 370 lbs

Floor mounted using: (6) - 1/2" Grade 5 bolts



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 156	2.38	1.0	1.5	3.81	2.86	1.59	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.					
15	8.2	>33.3						

Internal Components	Manufacturer/Material	Part #
Busbar	Copper	LAN-CS-410RB-B-ANGLE-1000
Busbar	Copper	LAN-CS-410RB-B-1000F
Fuses	Mersen	A4BQ1000

OSP APPLICATION
 Termaco – TCR Battery Cabinets and TCL Landing Cabinets
 III. UUT Summary Sheets

Date: 7/24/2017

Test Report PR056192-TR-17 – EUT5

Landing Cabinet – 2000A busbar and fuses, full harness
 GVPB2000A

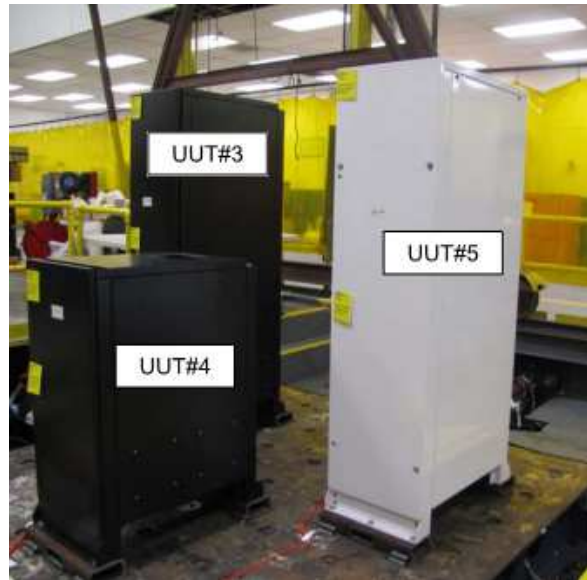
(GVX Landing Cabinet)

10 ga. Cold Form Steel frame and

16 ga. doors and side panels Cold Form Steel

20"W x 32.7"D x 77.5"H, 676 lbs

Floor mounted using: (6) - 1/2" Grade 5 bolts



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 156	2.38	1.0	1.5	3.81	2.86	1.59	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.					
17	17	>33.3						

Internal Components	Manufacturer/Material	Part #
Busbar	Copper	LAN-CS-410RB-B-2000F
Fuses	Mersen	A4BQ2000