

TWINPLUS MODULE SERIES

HIGH EFFICIENCY MONO-PERC M6-10B-R

530-550W



OUTSTANDING PRODUCT PERFORMANCE

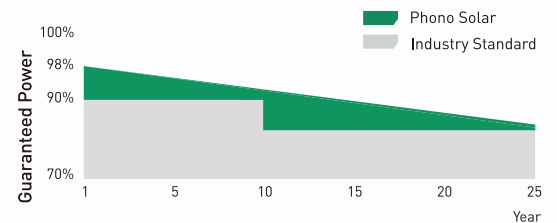
- Competitive high-temperature performance with ameliorated temperature coefficient
- Minimized power loss in cell connection
- Better performance under shading effect
- Decreased nominal operating cell temperature to $43 \pm 2^{\circ}\text{C}$
- Higher power generation with multi-busbar and half-cut technology

TRUSTWORTHY QUALITY AND RELIABILITY

- Guaranteed 0~+5W positive tolerance secures reliable power output
- 5400Pa maximum snow load, 2400Pa maximum wind load
- Optimized electrical design lowers hot spot risk and operating current

PID RESISTANT

- Industry-leading cell processing technology and electrical design ensure solid PID resistance



12-year Product Warranty | 25-year Linear Performance Warranty

MANAGEMENT SYSTEM CERTIFICATES

IEC 61215, IEC 61730

ISO 9001:2015 / Quality management system

ISO 14001:2015 / Standards for environmental management system

OHSAS 18001:2007 / International standards for occupational health & safety

IEC TS 62941: 2016 Terrestrial photovoltaic (PV) modules-guidelines for increased confidence in PV module design qualification and type approval

Bloomberg Tier1
NEW ENERGY FINANCE

2019 TOP PERFORMER
PVEL | DNV·GL
PV MODULE
RELIABILITY SCORECARD

ELECTRICAL TYPICAL VALUES

Model	PS530M6-24/TH		PS535M6-24/TH		PS540M6-24/TH		PS545M6-24/TH		PS550M6-24/TH	
	PS530M6H-24/TH	PS535M6H-24/TH	PS540M6H-24/TH	PS545M6H-24/TH	PS550M6H-24/TH					
Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Rated Power (P _{mpp})	530	401	535	405	540	409	545	412	550	416
Rated Current (I _{mpp})	12.86	10.38	12.92	10.43	12.98	10.48	13.04	10.53	13.10	10.57
Rated Voltage (V _{mpp})	41.22	38.64	41.41	38.82	41.61	39.00	41.80	39.18	41.99	39.36
Short Circuit Current (I _{sc})	13.46	10.86	13.54	10.93	13.62	10.99	13.70	11.06	13.78	11.12
Open Circuit Voltage (V _{oc})	49.06	45.70	49.13	45.77	49.20	45.83	49.27	45.90	49.34	45.97
Module Efficiency (%)	20.56		20.76		20.95		21.14		21.34	

STC(Standard Testing Conditions):Irradiance 1000W/m², AM 1.5, Cell Temperature 25°C

NOCT (Nominal Operation Cell Temperature): Irradiance 800W/m², Ambient Temperature 20°C, Spectra at AM1.5, Wind at 1m/S

MECHANICAL CHARACTERISTICS

Cell Type	Monocrystalline 182mm x 91mm
Dimension (L× W × H)	Length: 2273mm (89.49 inch)
	Width: 1134mm (44.65 inch)
	Height: 40mm (1.57 inch)
Weight	29.0kg (63.93 lbs)
Front Glass	3.2mm Toughened Glass
Frame	Anodized Aluminium Alloy
Cable	4mm ² (IEC), Length:350mm (vertical) 1300mm (horizontal) or Customized Length
Junction Box	IP 68 Rated

TEMPERATURE RATINGS

Voltage Temperature Coefficient	-0.30%/°C
Current Temperature Coefficient	+0.05%/°C
Power Temperature Coefficient	-0.38%/°C
Tolerance	0~+5w
NOCT	43±2°C

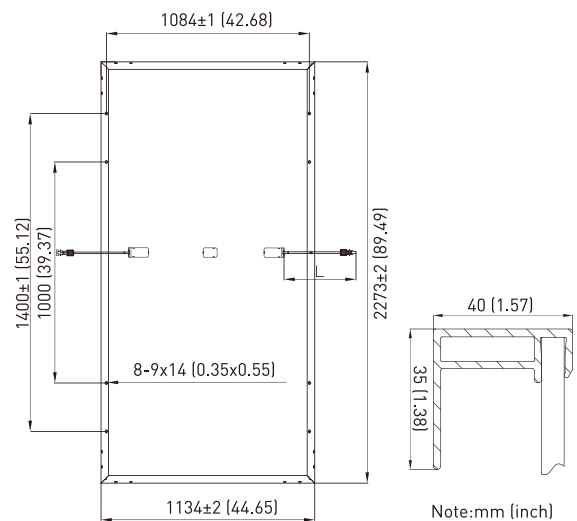
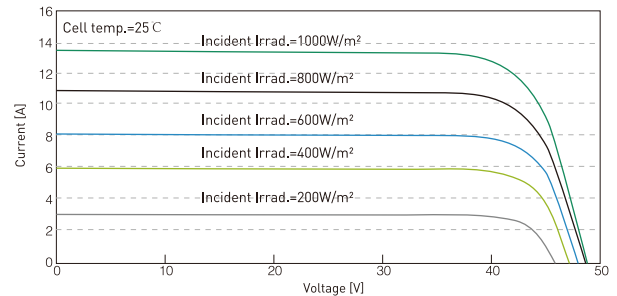
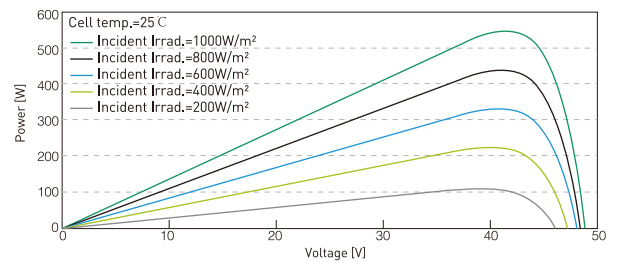
ABSOLUTE MAXIMUM RATING

Operating Temperature	From -40 to +85°C
Hail Diameter @ 80km/h	Up to 25mm
Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Maximum Series Fuse Rating	20A
PV Module Classification	II
Fire Rating (IEC 61730)	C
Module Fire Performance (UL 1703)	Type 4
Maximum System Voltage	DC 1000V/1500V

PACKING CONFIGURATION

Container	20' GP	40' HQ
Pieces/Container	205	540

ELECTRICAL CHARACTERISTICS



ECO-TOP

ROOFTOP MOUNTING SYSTEMS



Elevating the Future for Solar



ECO-TOP

The Eco-Top rooftop system's modular design makes installation and system design fast and easy.

- » The most effective wire support system available
- » Integrated (UL approved) grounding
- » Class A fire rated (UL approved)
- » Module tilting for ease of maintenance
- » Lowest system weight
- » SEAOC compliant
- » Fast to install

Integral Wind Deflector

Integral wind deflector minimizes system loading and also functions as a ballast tray, providing a location to place ballast in the array.

Structural Components

All components are constructed from g115 galvanized steel. Additionally, entire assembly has been rated as Class A fire rated by UL for fire safety.

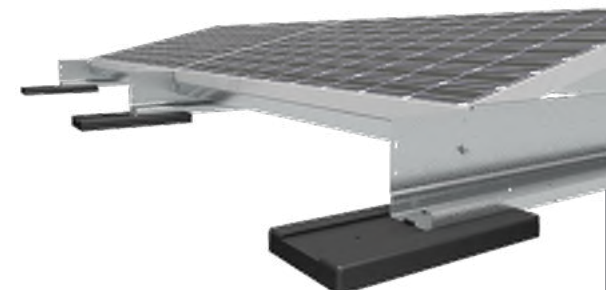
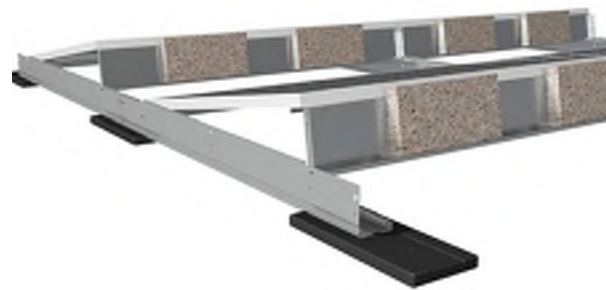
Fasteners

- » Serrated flange heads
- » Vibration resistance and integral grounding and bonding
- » All nuts are wax coated to eliminate galling

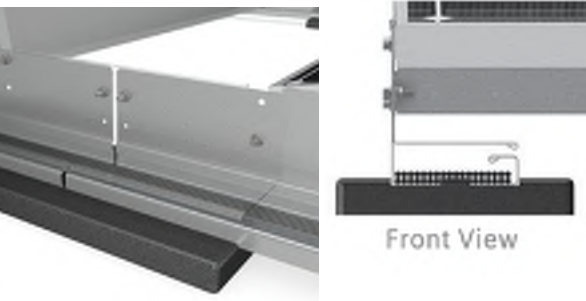
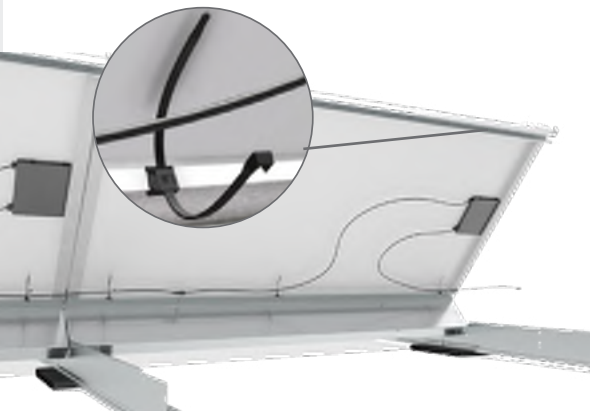
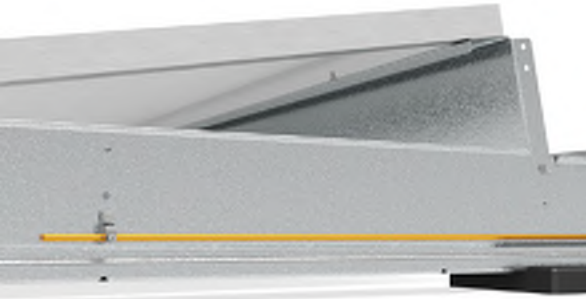
Molded Rubber Pad

Durable recycled rubber ballast pads provide a safe mounting surface with a high coefficient of friction. This results in reduced system loads, while protecting all equipment by minimizing vibration. In most cases the rubber pad eliminates the need for a slip sheet.

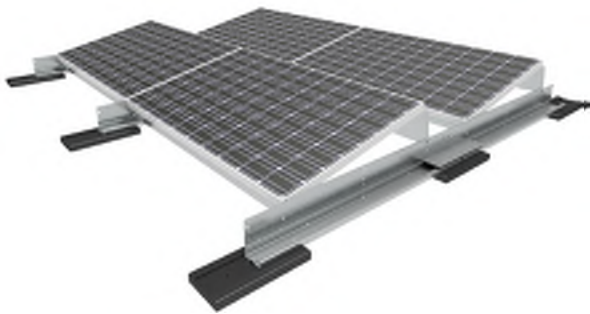
- » UV Resistant (extended lifespan)
- » Recycled Rubber (LEED credits)



ECO-TOP



Front View



Grounding and Bonding

Grounding and bonding via serrated hardware certified to UL SDT 2703 (listing available upon request). It is recommended that a ILSCO GBL-4DBT ground lug be used.

Grounding lug attaches to the N-S Beam.

Wire Clips

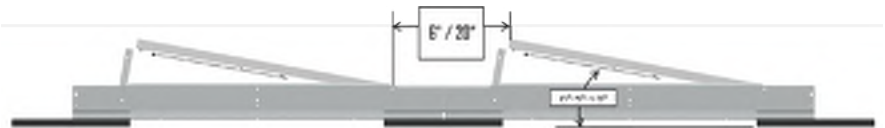
UV-rated flexible wire ties with easy to install push clips. Wire clips can be mounted anywhere on the rear panel beam. (UL Approved)

Integrated Wire Support

Flexible, UV protected Wire Support provided on every panel. Wires can be easily added before or after panel assembly.

PV Module Tilting

Modules can quickly and securely be tilted for ease of wiring and maintenance.



TECHNICAL SPECIFICATIONS

Tilt Angle	5° / 10°
Module Suitability	All Major Brands
Shade Spacing	6in. / 20in.
Warranty	20 Years

DCE SOLAR serves as market leader in industrial grade solar mounting hardware and consulting. DCE Solar leverages world-class engineering, fabrication facilities and American master craftsmen to create a full catalog of superior fixed-tilt mounting solutions for ground arrays and fixed-tilt solutions for roofs.



Elevating the Future for Solar |  Made in America

DCE Solar

19410 Jetton Road Suite 220 Cornelius, NC 28031 USA

Telephone: 704-659-7474 **Fax:** 704-875-0781

info@DCEsolar.com www.DCEsolar.com

50/60kW, 1000Vdc String Inverters for North America

The 50 & 60kW (55 & 66kVA) medium power CPS three phase string inverters are designed for ground mount, large rooftop and carport applications. The units are high performance, advanced and reliable inverters designed specifically for the North American environment and grid. High efficiency at 98.8% peak and 98.5% CEC, wide operating voltages, broad temperature ranges and a NEMA Type 4X enclosure enable this inverter platform to operate at high performance across many applications. The CPS 50/60KTL products ship with either the Standard wire-box or the Rapid Shutdown wire-box, each fully integrated and separable with touch safe fusing, monitoring, and AC and DC disconnect switches. The integrated PLC transmitter in the Rapid Shutdown wire-box enables PVRSS certified module-level rapid shutdown when used with the Tigo TS4-F/TS4-A-F products, APS RSD-S-PLC-A products, and NEP PVG-4 products. The CPS Flex Gateway enables monitoring, controls and remote product upgrades.

Key Features

- NEC 2017 PVRSS Certified Rapid Shutdown
- 55 & 66kVA rating allows max rated Active Power @±0.91PF
- Selectable Max AC Apparent Power of 50/55kVA and 60/66kVA
- NEC 2014/17 compliant & UL listed Arc-Fault circuit protection
- 15-90° Mounting orientation for low profile roof installs
- Optional Flex Gateway enables remote FW upgrades
- Integrated AC & DC disconnect switches
- 3 MPPT's with 5 inputs each for maximum flexibility
- Copper and Aluminum compatible AC connections
- NEMA Type 4X outdoor rated, tough tested enclosure
- UL1741 SA Certified to CA Rule 21, including SA14 FW and SA15 VW
- Separable wire-box design for fast service
- Standard 10 year warranty with extensions to 20 years
- Generous 1.8 and 1.5 DC/AC Inverter Load Ratios



CPS SCA50KTL-DO/US-480
CPS SCA60KTL-DO/US-480



50/60KTL Standard Wire-box



50/60KTL Rapid Shutdown Wire-box

Model Name	CPS SCA50KTL-DO/US-480	CPS SCA60KTL-DO/US-480
DC Input		
Max. PV Power	90kW (33kW per MPPT)	
Max. DC Input Voltage	1000Vdc	
Operating DC Input Voltage Range	200-950Vdc	
Start-up DC Input Voltage / Power	330V / 80W	
Number of MPP Trackers	3	
MPPT Voltage Range @ PF>0.99	480-850Vdc	540-850Vdc
Max. PV Short-Circuit Current (Isc x 1.25)	204A (68A per MPPT)	
Number of DC Inputs	15 inputs, 5 per MPPT	
DC Disconnection Type	Load-rated DC switch	
DC Surge Protection	Type II MOV, 2800V _C , 20kA I _{TM} (8/20μS)	
AC Output		
Rated AC Output Power @ PF>0.99 to ±0.91 ¹	50kW	60kW
Max. AC Apparent Power (Selectable)	50/55kVA	60/66kVA
Rated Output Voltage	480Vac	
Output Voltage Range ²	422 - 528Vac	
Grid Connection Type	3Φ / PE / N (Neutral optional)	
Max. AC Output Current @480Vac	60.2/66.2A	72.2/79.4A
Rated Output Frequency	60Hz	
Output Frequency Range ²	57 - 63Hz	
Power Factor	>0.99 (±0.8 adjustable)	
Current THD @ Rated Load	<3%	
Max. Fault Current Contribution (1 Cycle RMS)	64.1A	
Max. OCPD Rating	110A	125A
AC Disconnection Type	Load-break rated AC switch	
AC Surge Protection	Type II MOV, 1240V _C , 15kA I _{TM} (8/20μS)	
System and Performance		
Topology	Transformerless	
Max. Efficiency	98.8%	
CEC Efficiency	98.5%	
Stand-by / Night Consumption	<1W	
Environment		
Enclosure Protection Degree	NEMA Type 4X	
Cooling Method	Variable speed cooling fans	
Operating Temperature Range ³	-22°F to +140°F / - 30°C to +60°C	
Non-Operating Temperature Range ⁴	No low temp minimum to +158°F / +70°C maximum	
Operating Humidity	0 to 100%	
Operating Altitude	13,123.4ft / 4000m (derating from 9842.5ft / 3000m)	
Audible Noise	<60dBA @ 1m and 25°C	
Display and Communication		
User Interface and Display	LCD+LED	
Inverter Monitoring	SunSpec, Modbus RS485	
Site Level Monitoring	CPS Flex Gateway (1 per 32 inverters)	
Modbus Data Mapping	CPS	
Remote Diagnostics / FW Upgrade Functions	Standard / (with Flex Gateway)	
Mechanical		
Dimensions (HxWxD)	39.4 x 23.6 x 10.24in. (1000 x 600 x 260mm)	
Weight	Inverter: 123.5lbs/56kg; Wire-box: 33lbs/15kg	
Mounting / Installation Angle ⁵	15 to 90 degrees from horizontal (vertical or angled)	
AC Termination	M8 Stud Type Terminal Block (Wire range: #6 - 3/0AWG CU/AL, Lugs not supplied)	
DC Termination ⁶	Screw Clamp, Neg. Busbar (RSD version ⁶) Wire range: #14 - #6AWG CU	
Fused String Inputs (5 per MPPT) ⁷	15A fuses provided (Fuse values up to 30A acceptable)	
Safety		
Certifications and Standards	UL1741SA-2016, UL1699B, CSA-C22.2 NO.107.1-01, IEEE1547a-2014; FCC PART15	
Selectable Grid Standard	IEEE 1547a-2014, CA Rule 21, ISO-NE	
Smart-Grid Features	Volt-RideThru, Freq-RideThru, Ramp-Rate, Specified-PF, Volt-VAr, Freq-Watt, Volt-Watt	
Warranty		
Standard	10 years	
Extended Terms	15 and 20 years	

1) Active Power Derating begins; at PF=±0.91 to ±0.8 when Max AC Apparent Power is set to 55 or 66kVA.

2) The "Output Voltage Range" and "Output Frequency Range" may differ according to the specific grid standard.

3) Active Power Derating begins; at 40°C when PF=±0.9 and MPPT ≥V_{min}, at 45°C when PF=1 and MPPT ≥V_{min}, and at 50°C when PF=1 and MPPT V ≥ 700Vdc.

4) See user manual for further requirements regarding non-operating conditions.

5) Shade Cover accessory required for installation angles of 75 degrees or less.

6) RSD wire-box only includes fuses/fuseholders on the positive polarity, compliant with NEC 2017, 690.9 (C).

7) Fuse values above 20A have additional spacing requirements or require the use of the Y-Comb Terminal Block. See user manual for details.



**PowerPact™ R-frame Main Circuit Breaker on Left
with I-Line™ Distribution Section on Right**

Features

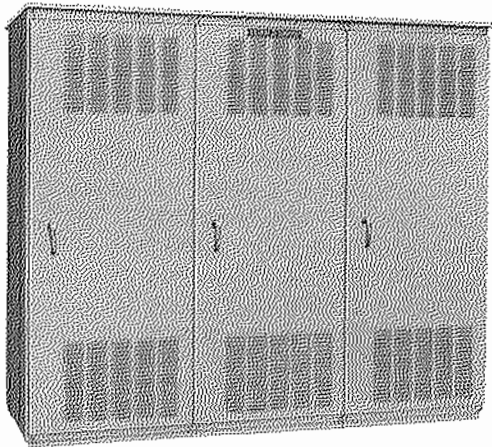
- Sections rated to 5000 A horizontal bus, 3000 A vertical bus
- Single mains to 5000 A
- Six subdivision mains to 4000 A
- Individually mounted feeders to 4000 A
- Suitable for service entrance or distribution
- NEMA Type 1 or Type 3R enclosures
- Front or front and rear accessible
- 91.5 in. (2324 mm) high with base channels
- Section widths available: 12 in. (305 mm), 24 in. (610 mm), 30 in. (762 mm), 36 in. (914 mm), 42 in. (1067 mm), 48 in. (1219 mm), or 54 in. (1372 mm) wide
- Frame depths available: 24 in. (610 mm), 36 in. (914 mm), 48 in. (1219 mm), 54 in. (1372 mm), or 60 in. (1524 mm)
- Voltage to 600 Vac or 250 Vdc
- Factory assembled
- Hot or cold sequence utility metering
- Customer metering
- Surge protective devices (SPD)

Power-Style™ QED-2 switchboards provide a convenient and economical means of distributing electric power. These enclosed, free-standing structures contain circuit breaker or fusible overcurrent protection for services rated up to 5000 A with a maximum voltage of 600 Vac. Power-Style QED-2 switchboards are custom-made for use as service entrance equipment or as distribution centers in commercial, institutional, and industrial applications.

An auxiliary section is also available for cable or bus transition or to provide additional space for connecting the service conductors to the line side of the main. The auxiliary section is a full-height section with a depth to match that of the adjacent section. It can contain customer metering or through bus and incoming lug pads.

The QED-2 frame allows various special components to be mounted in the switchboard. These components include automatic throwover systems, transfer switches, and special metering systems. This flexibility means the QED-2 switchboard can meet customer requirements on the most complicated applications.

Structures



NEMA Type 3R Enclosure Over Three Sections

The QED-2 switchboard frame has been designed to provide a sturdy platform on which to build Schneider Electric switchboard products. Individual switchboard sections are built from formed steel channels and angles, then secured together with thread-rolling screws. These thread-rolling screws, when compared with regular self-tapping screws, provide superior torque and strip-out resistant qualities.

Section dimensions are determined by the type, size, quantity, and arrangement of the components and devices being installed.

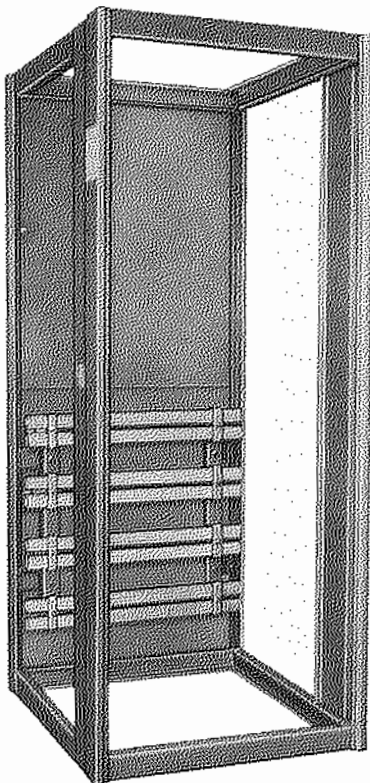
Each section features a removable one-piece top plate, which makes locating the top conduit entry simple. When extra height is required, Schneider Electric can supply a 12 in. (305 mm) or 24 in. (610 mm) high pullbox. (The pullbox is not available with NEMA Type 3R enclosures.)

All covers, doors, and frames are made of formed steel for extra rigidity. A deep front corner channel and side plate covers the sides. The back is covered with removable plates that have formed edges. All covers are secured with slot/hex head thread rolling screws which greatly minimize the chances of thread strip-out.

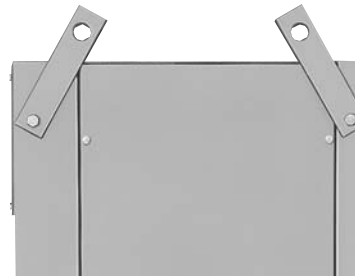
The standard paint finish on all Power-Style QED-2 switchboards is an ANSI #49 medium light gray baked enamel over an iron phosphate pretreatment. Non-standard finishes are an available option when specified.

QED-2 switchboards are available in either NEMA Type 1 indoor or Type 3R outdoor enclosures.

Each QED-2 section 3000 A or less has removable lifting bars and is clearly labeled with handling procedures. The sections are shipped separately to allow the installer extra flexibility when moving the sections to the desired location. Once in place, the sections are secured together, linking the strength of each frame. Optional multiple-section shipments do not have lifting bars.



QED-2 Frame and Through Bus



**Lifting Bars Can Be Used On QED-2
NEMA Type 1 Sections Up To 3000 A**

Three-phase pad-mounted compartmental type transformer



General

At Eaton, we are constantly striving to introduce new innovations to the transformer industry, bringing you the highest quality, most reliable transformers. Eaton's Cooper Power series Transformer Products are ISO 9001 compliant, emphasizing process improvement in all phases of design, manufacture, and testing. In order to drive this innovation, we have invested both time and money in the Thomas A. Edison Technical Center, our premier research facility in Franksville, Wisconsin. Such revolutionary products as distribution-class UltraSIL™ Polymer-Housed Evolution™ surge arresters and Envirotemp™ FR3™ fluid have been developed at our Franksville lab.

With transformer sizes ranging from 45 kVA to 12 MVA and high voltages ranging from 2400 V to 46 kV, Eaton has you covered. From fabrication of the tanks and cabinets to winding of the cores and coils, to production of arresters, switches, tap changers, expulsion fuses, current limit fuses, bushings (live and dead) and molded rubber goods, Eaton does it all. Eaton's Cooper Power series transformers are available with electrical grade mineral oil or Envirotemp™ FR3™ fluid, a less-flammable and bio-degradable fluid. Electrical codes recognize the advantages of using Envirotemp™ FR3™ fluid both indoors and outdoors for fire sensitive applications. The bio-based fluid meets Occupational Safety and Health Administration (OSHA) and Section 450.23 NEC Requirements.

EATON

Powering Business Worldwide

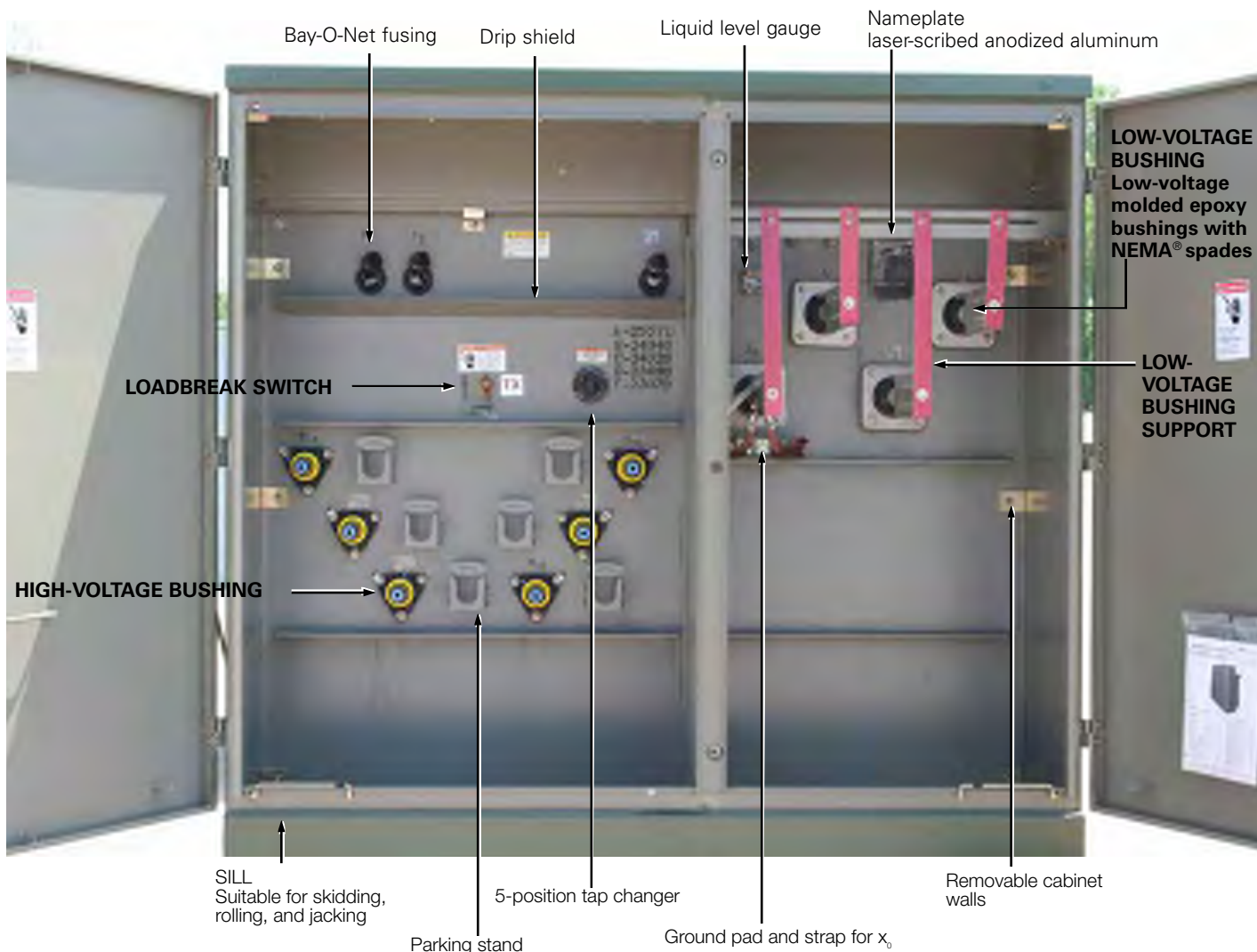


Figure 1. Three-phase pad-mounted compartmental type transformer.

Table 1. Product Scope

Type	Three Phase, 50 or 60 Hz, 65 °C Rise (55 °C, 55/65 °C), 65/75 °C, 75 °C
Fluid Type	Mineral oil or Envirotemp™ FR3™ fluid
Coil Configuration	2-winding or 4-winding or 3-winding (Low-High-Low), 3-winding (Low-Low-High)
Size	45 – 10,000 kVA
Primary Voltage	2,400 – 46,000 V
Secondary Voltage	208Y/120 V to 14,400 V
Specialty Designs	Inverter/Rectifier Bridge
	K-Factor (up to K-19)
	Vacuum Fault Interrupter (VFI)
	UL® Listed & Labeled and Classified
	Factory Mutual (FM) Approved®
	Solar/Wind Designs
	Differential Protection
	Seismic Applications (including OSHPD)
	Hardened Data Center

Table 2. Three-Phase Ratings

Three-Phase 50 or 60 Hz

kVA Available¹
 45, 75, 112.5, 150, 225, 300, 500, 750, 1000, 1500, 2000, 2500, 3000, 3750, 5000, 7500, 10000

¹Transformers are available in the standard ratings and configurations shown or can be customized to meet specific needs.

Table 3. Impedance Voltage

Rating (kVA)	Low-voltage rating		
	≤ 600 V	2400 Δ through 4800 Δ	6900 Δ through 13800GY/7970 or 13800 Δ
45-75	2.70-5.75	2.70-5.75	2.70-5.75
112.5-300	3.10-5.75	3.10-5.75	3.10-5.75
500	4.35-5.75	4.35-5.75	4.35-5.75
750-2500	5.75	5.75	5.75
3750	5.75	5.75	6.00
5000		6.00	6.50

Note: The standard tolerance is ± 7.5%

Table 4. Audible Sound Levels

Self-Cooled, Two Winding kVA Rating	NEMA® TR-1 Average
	Decibels (dB)
45-500	56
501-700	57
701-1000	58
1001-1500	60
1501-2000	61
2001-2500	62
2501-3000	63
3001-4000	64
4001-5000	65
5001-6000	66
6001-7500	67
7501-10000	68

Table 5. Insulation Test Levels

KV Class	Induced Test 180 or 400 Hz 7200 Cycle	kV BIL Distribution	Applied Test 60 Hz (kV)
1.2	Twice Rated Voltage	30	10
2.5		45	15
5		60	19
8.7		75	26
15		95	34
25		125	40
34.5		150	50

Table 6. Temperature Rise Ratings 0-3300 Feet (0-1000 meters)

	Standard	Optional
Unit Rating (Temperature Rise Winding)	65 °C	55 °C, 55/65 °C, 75 °C
Ambient Temperature Max	40 °C	50 °C
Ambient Temperature 24 Hour Average	30 °C	40 °C
Temperature Rise Hotspot	80 °C	65 °C

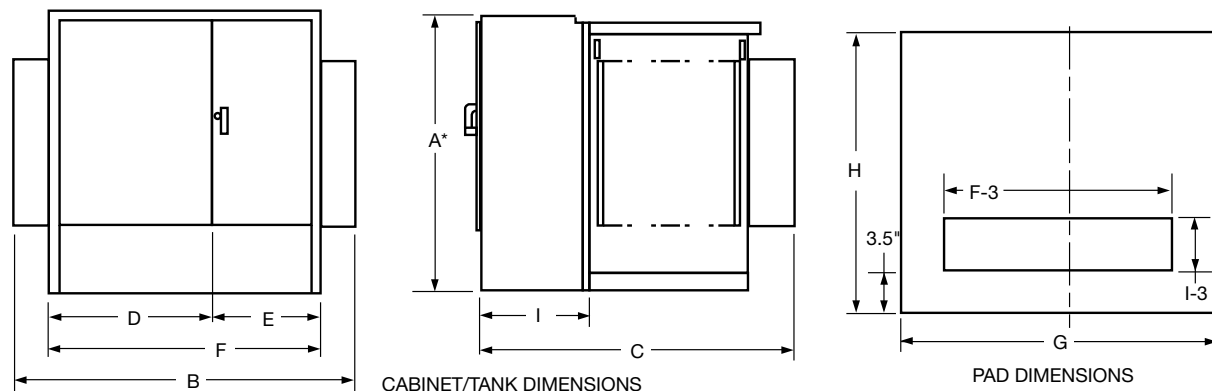


Figure 2. Transformer and pad dimensions.

* Add 9" for Bay-O-Net fusing.

Table 7. Fluid-filled—aluminum windings 55/65 °C Rise¹

65° Rise kVA Rating	DEAD-FRONT—LOOP OR RADIAL FEED—BAY-O-NET FUSING OIL FILLED—ALUMINUM WINDINGS									Gallons of Fluid	Approx. Total Weight (lbs.)
	OUTLINE DIMENSIONS (in.)										
	A*	B	C	D	E	F	G	H	I		
45	50	68	39	42	26	68	72	43	20	110	2,100
75	50	68	39	42	26	68	72	43	20	115	2,250
112.5	50	68	49	42	26	68	72	53	20	120	2,350
150	50	68	49	42	26	68	72	53	20	125	2,700
225	50	72	51	42	30	72	76	55	20	140	3,150
300	50	72	51	42	30	72	76	55	20	160	3,650
500	50	89	53	42	30	72	93	57	20	190	4,650
750	64	89	57	42	30	72	93	61	20	270	6,500
1000	64	89	59	42	30	72	93	63	20	350	8,200
1500	73	89	86	42	30	72	93	90	24	410	10,300
2000	73	72	87	42	30	72	76	91	24	490	12,500
2500	73	72	99	42	30	72	76	103	24	530	14,500
3000	73	84	99	46	37	84	88	103	24	620	16,700
3750	84	85	108	47	38	85	88	112	24	660	19,300
5000	84	96	108	48	48	96	100	112	24	930	25,000
7500	94	102	122	54	48	102	100	126	24	1,580	41,900

¹ Weights, gallons of fluid, and dimensions are for reference only and not for construction. Please contact Eaton for exact dimensions.

* Add 9" for Bay-O-Net fusing.

Table 8. Fluid-Filled—Copper Windings 55/65 °C Rise¹

65° Rise kVA Rating	DEAD-FRONT—LOOP OR RADIAL FEED—BAY-O-NET FUSING OIL FILLED—COPPER WINDINGS									Gallons of Fluid	Approx. Total Weight (lbs.)
	OUTLINE DIMENSIONS (in.)										
	A*	B	C	D	E	F	G	H	I		
45	50	64	39	34	30	64	69	43	20	110	2,100
75	50	64	39	34	30	64	69	43	20	115	2,350
112.5	50	64	49	34	30	64	69	53	20	115	2,500
150	50	64	49	34	30	64	69	53	20	120	2,700
225	50	64	51	34	30	64	73	55	20	140	3,250
300	50	64	51	34	30	64	75	55	20	160	3,800
500	50	81	53	34	30	64	85	57	20	200	4,800
750	64	89	57	42	30	72	93	61	20	255	6,500
1000	64	89	59	42	30	72	93	63	20	300	7,800
1500	73	89	86	42	30	72	93	90	24	410	10,300
2000	73	72	87	42	30	72	76	91	24	420	11,600
2500	73	72	99	42	30	72	76	103	24	500	14,000
3000	73	84	99	46	37	84	88	103	24	720	18,700
3750	84	85	108	47	38	85	88	112	24	800	20,500
5000	84	96	108	48	48	96	100	112	24	850	25,000
7500	94	102	122	54	48	102	100	126	24	1,620	46,900

¹ Weights, gallons of fluid, and dimensions are for reference only and not for construction. Please contact Eaton for exact dimensions.

* Add 9" for Bay-O-Net fusing.


ANALYTICAL REPORT

Eurofins TestAmerica, Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

Laboratory Job ID: 240-122464-1
Client Project/Site: Solar Module TCLP

For:
SUMEC Energy Holdings Co. Ltd.
No.1 Xinghuo Road
Nanjing Hi-tech Zone
Nanjing, China 210061

Attn: Mr. Chester Chen



Authorized for release by:
12/3/2019 7:25:49 PM

Michael DelMonico, Project Manager I
(330)497-9396
michael.delmonico@testamericainc.com

LINKS

Review your project
results through
TotalAccess

Have a Question?



Visit us at:
www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



Table of Contents

Cover Page	1
Table of Contents	2
Definitions/Glossary	3
Case Narrative	4
Method Summary	5
Sample Summary	6
Detection Summary	7
Client Sample Results	8
QC Sample Results	9
QC Association Summary	11
Lab Chronicle	12
Certification Summary	13
Chain of Custody	14

Definitions/Glossary

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Job ID: 240-122464-1

Laboratory: Eurofins TestAmerica, Canton

Narrative

CASE NARRATIVE

Client: SUMEC Energy Holdings Co. Ltd.

Project: Solar Module TCLP

Report Number: 240-122464-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, Canton attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

RECEIPT

The sample was received on 11/18/2019 11:10 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 13.8° C.

TCLP METALS (ICP)

Sample SOLAR PANEL (240-122464-1) was analyzed for TCLP metals (ICP) in accordance with EPA SW-846 Methods 1311/6010B. The sample was leached on 11/25/2019, prepared on 11/26/2019 and analyzed on 11/27/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP MERCURY

Sample SOLAR PANEL (240-122464-1) was analyzed for TCLP mercury in accordance with EPA SW-846 Methods 1311/7470A. The sample was leached on 11/25/2019, prepared on 11/26/2019 and analyzed on 11/27/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method Summary

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL CAN
7470A	Mercury (CVAA)	SW846	TAL CAN
1311	TCLP Extraction	SW846	TAL CAN
3010A	Preparation, Total Metals	SW846	TAL CAN
7470A	Preparation, Mercury	SW846	TAL CAN
Part Size Red	Particle Size Reduction Preparation	None	TAL CAN

Protocol References:

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Sample Summary

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-122464-1	SOLAR PANEL	Solid	11/14/19 00:00	11/18/19 11:10	

1

2

3

4

5

6

7

8

9

10

11

12

13

Detection Summary

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Client Sample ID: SOLAR PANEL

Lab Sample ID: 240-122464-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	4.3		0.050		mg/L	1		6010B	TCLP

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Canton

Client Sample Results

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Client Sample ID: SOLAR PANEL

Lab Sample ID: 240-122464-1

Date Collected: 11/14/19 00:00

Matrix: Solid

Date Received: 11/18/19 11:10

Method: 6010B - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050		mg/L		11/26/19 14:00	11/27/19 10:08	1
Barium	ND		0.50		mg/L		11/26/19 14:00	11/27/19 10:08	1
Cadmium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 10:08	1
Chromium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 10:08	1
Lead	4.3		0.050		mg/L		11/26/19 14:00	11/27/19 10:08	1
Selenium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 10:08	1
Silver	ND		0.050		mg/L		11/26/19 14:00	11/27/19 10:08	1

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0020		mg/L		11/26/19 14:00	11/27/19 18:19	1

QC Sample Results

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 240-412722/2-A
Matrix: Solid
Analysis Batch: 412928

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 412722

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:59	1
Barium	ND		0.50		mg/L		11/26/19 14:00	11/27/19 09:59	1
Cadmium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:59	1
Chromium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:59	1
Lead	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:59	1
Selenium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:59	1
Silver	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:59	1

Lab Sample ID: LCS 240-412722/3-A
Matrix: Solid
Analysis Batch: 412928

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 412722

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	2.00	2.15		mg/L		108	50 - 150
Barium	2.00	2.00		mg/L		100	50 - 150
Cadmium	1.00	1.05		mg/L		105	50 - 150
Chromium	1.00	1.01		mg/L		101	50 - 150
Lead	1.00	0.900		mg/L		90	50 - 150
Selenium	2.00	2.13		mg/L		106	50 - 150
Silver	0.100	0.107		mg/L		107	50 - 150

Lab Sample ID: LB 240-412574/1-B
Matrix: Solid
Analysis Batch: 412928

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 412722

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:54	1
Barium	ND		0.50		mg/L		11/26/19 14:00	11/27/19 09:54	1
Cadmium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:54	1
Chromium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:54	1
Lead	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:54	1
Selenium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:54	1
Silver	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:54	1

Lab Sample ID: 240-122464-1 MS
Matrix: Solid
Analysis Batch: 412928

Client Sample ID: SOLAR PANEL
Prep Type: TCLP
Prep Batch: 412722

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	ND		5.00	5.46		mg/L		109	75 - 125
Barium	ND		50.0	51.9		mg/L		103	75 - 125
Cadmium	ND		1.00	1.12		mg/L		112	75 - 125
Chromium	ND		5.00	5.38		mg/L		108	75 - 125
Lead	4.3		5.00	9.84		mg/L		110	75 - 125
Selenium	ND		1.00	1.14		mg/L		114	75 - 125
Silver	ND		1.00	1.07		mg/L		107	75 - 125

QC Sample Results

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: 240-122464-1 MSD
Matrix: Solid
Analysis Batch: 412928

Client Sample ID: SOLAR PANEL
Prep Type: TCLP
Prep Batch: 412722

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Arsenic	ND		5.00	5.59		mg/L		112	75 - 125	2	20
Barium	ND		50.0	54.0		mg/L		108	75 - 125	4	20
Cadmium	ND		1.00	1.14		mg/L		114	75 - 125	2	20
Chromium	ND		5.00	5.43		mg/L		109	75 - 125	1	20
Lead	4.3		5.00	9.95		mg/L		112	75 - 125	1	20
Selenium	ND		1.00	1.16		mg/L		116	75 - 125	2	20
Silver	ND		1.00	1.09		mg/L		109	75 - 125	2	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 240-412725/2-A
Matrix: Solid
Analysis Batch: 413058

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 412725

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Mercury	ND		0.0020		mg/L		11/26/19 14:00	11/27/19 18:15	1

Lab Sample ID: LCS 240-412725/3-A
Matrix: Solid
Analysis Batch: 413058

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 412725

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
		Added	Result				Qualifier
Mercury	0.00500	0.00549		mg/L		110	80 - 120

Lab Sample ID: LB 240-412574/1-D
Matrix: Solid
Analysis Batch: 413058

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 412725

Analyte	LB	LB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Mercury	ND		0.0020		mg/L		11/26/19 14:00	11/27/19 18:13	1

Lab Sample ID: 240-122464-1 MS
Matrix: Solid
Analysis Batch: 413058

Client Sample ID: SOLAR PANEL
Prep Type: TCLP
Prep Batch: 412725

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				Limits
Mercury	ND		0.00500	0.00564		mg/L		113	80 - 120

Lab Sample ID: 240-122464-1 MSD
Matrix: Solid
Analysis Batch: 413058

Client Sample ID: SOLAR PANEL
Prep Type: TCLP
Prep Batch: 412725

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Mercury	ND		0.00500	0.00563		mg/L		113	80 - 120	0	20

QC Association Summary

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Metals

Processed Batch: 412195

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-122464-1	SOLAR PANEL	TCLP	Solid	Part Size Red	
240-122464-1 MS	SOLAR PANEL	TCLP	Solid	Part Size Red	
240-122464-1 MSD	SOLAR PANEL	TCLP	Solid	Part Size Red	

Leach Batch: 412574

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-122464-1	SOLAR PANEL	TCLP	Solid	1311	412195
LB 240-412574/1-B	Method Blank	TCLP	Solid	1311	
LB 240-412574/1-D	Method Blank	TCLP	Solid	1311	
240-122464-1 MS	SOLAR PANEL	TCLP	Solid	1311	412195
240-122464-1 MSD	SOLAR PANEL	TCLP	Solid	1311	412195

Prep Batch: 412722

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-122464-1	SOLAR PANEL	TCLP	Solid	3010A	412574
LB 240-412574/1-B	Method Blank	TCLP	Solid	3010A	412574
MB 240-412722/2-A	Method Blank	Total/NA	Solid	3010A	
LCS 240-412722/3-A	Lab Control Sample	Total/NA	Solid	3010A	
240-122464-1 MS	SOLAR PANEL	TCLP	Solid	3010A	412574
240-122464-1 MSD	SOLAR PANEL	TCLP	Solid	3010A	412574

Prep Batch: 412725

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-122464-1	SOLAR PANEL	TCLP	Solid	7470A	412574
LB 240-412574/1-D	Method Blank	TCLP	Solid	7470A	412574
MB 240-412725/2-A	Method Blank	Total/NA	Solid	7470A	
LCS 240-412725/3-A	Lab Control Sample	Total/NA	Solid	7470A	
240-122464-1 MS	SOLAR PANEL	TCLP	Solid	7470A	412574
240-122464-1 MSD	SOLAR PANEL	TCLP	Solid	7470A	412574

Analysis Batch: 412928

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-122464-1	SOLAR PANEL	TCLP	Solid	6010B	412722
LB 240-412574/1-B	Method Blank	TCLP	Solid	6010B	412722
MB 240-412722/2-A	Method Blank	Total/NA	Solid	6010B	412722
LCS 240-412722/3-A	Lab Control Sample	Total/NA	Solid	6010B	412722
240-122464-1 MS	SOLAR PANEL	TCLP	Solid	6010B	412722
240-122464-1 MSD	SOLAR PANEL	TCLP	Solid	6010B	412722

Analysis Batch: 413058

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-122464-1	SOLAR PANEL	TCLP	Solid	7470A	412725
LB 240-412574/1-D	Method Blank	TCLP	Solid	7470A	412725
MB 240-412725/2-A	Method Blank	Total/NA	Solid	7470A	412725
LCS 240-412725/3-A	Lab Control Sample	Total/NA	Solid	7470A	412725
240-122464-1 MS	SOLAR PANEL	TCLP	Solid	7470A	412725
240-122464-1 MSD	SOLAR PANEL	TCLP	Solid	7470A	412725

Lab Chronicle

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Client Sample ID: SOLAR PANEL

Lab Sample ID: 240-122464-1

Date Collected: 11/14/19 00:00

Matrix: Solid

Date Received: 11/18/19 11:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Processed	Part Size Red			412195	11/22/19 08:42	POP	TAL CAN
TCLP	Leach	1311			412574	11/25/19 16:55	DRJ	TAL CAN
TCLP	Prep	3010A			412722	11/26/19 14:00	MRL	TAL CAN
TCLP	Analysis	6010B		1	412928	11/27/19 10:08	WKD	TAL CAN
TCLP	Processed	Part Size Red			412195	11/22/19 08:42	POP	TAL CAN
TCLP	Leach	1311			412574	11/25/19 16:55	DRJ	TAL CAN
TCLP	Prep	7470A			412725	11/26/19 14:00	MRL	TAL CAN
TCLP	Analysis	7470A		1	413058	11/27/19 18:19	SLD	TAL CAN

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Accreditation/Certification Summary

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Laboratory: Eurofins TestAmerica, Canton

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
California	State Program	2927	02-23-20

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
7470A	7470A	Solid	Mercury

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

13.1/13.8

SUMEC

SUMEC ENERGY HOLDINGS CO.,LTD.

江苏苏美达能源控股有限公司

致TO Eurofins TestAmerica

发票编号 INV.NO. SUMEC-EUROFINS-20191114

#101 Shuffel Street NW, North Canton, OH 44720, USA

日期 DATE 2019/11/14

发 票
COMMERCIAL INVOICE

L/C NO.

唛头及编号 Mark && Numbers	品名 Descriptions	数量 Quantities	单价 Unit Price	总价 Amount
N/M	raw material sample of solar module	2 SET	USD 5.00	USD 10
		2 SET		10.00

TOTAL:PACKED IN: 1 CARTON

G/W: 1 KGS

N/W: 0.9 KGS

SUMEC ENERGY HOLDINGS CO.,LTD.
NO.1 XINGHUO ROAD, NATIONAL LEVEL NANJING
HI-TECH ZONE, NANJING, 210061 P.R. CHINA

江苏苏美达能源控股有限公司
SUMEC ENERGY HOLDINGS CO.,LTD.

王健

Accepted by Lab 11/18/19
T/PCF ETA 1110



240-122464 Chain of Custody

Eurofins TestAmerica Canton Sample Receipt Form/Narrative Login #: 122464
Canton Facility

Client: Samtec Energy Holdings Inc Site Name: _____ Cooler unpacked by: Ryan Cribler
Cooler Received on: 11-18-19 Opened on: 11-18-19 1110
FedEx: 1st Grd Exp UPS FAS Clipper ~~Client Drop Off~~ TestAmerica Courier Other: DHL

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # _____ Foam Box _____ Client Cooler Box Other _____
Packing material used: Bubble Wrap _____ Foam Plastic Bag None _____ Other _____
COOLANT: Wet Ice _____ Blue Ice _____ Dry Ice _____ Water None

1. Cooler temperature upon receipt See Multiple Cooler Form
IR GUN #IR-10 (CF +0.7°C) Observed Cooler Temp. 13.1 °C Corrected Cooler Temp. 13.8 °C
IR GUN #IR-11 (CF +0.9°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 Yes No
-Were the seals on the outside of the cooler(s) signed & dated? Yes No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
-Were tamper/custody seals intact and uncompromised? Yes No NA

3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No

If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC995364
13. Were VOAs on the COC? Yes No
14. Were air bubbles >6 mm in any VOA vials? Yes Larger than this. Yes No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____ Yes No
16. Was a LL Hg or Me Hg trip blank present? Yes No

Tests that are not checked for pH by Receiving:
VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other _____
Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by: _____

Will log ID as "Solar Panel" sample date w/ 11/4/19 (date at top of COC/letter), no sample time. Will log TEL Metals w/ PSR per PM.

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify-PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____
VOA Sample Preservation - Date/Time VOAs Frozen: _____



An Employee-Owned Company

October 13, 2021

Mr. Kyle Perry
Verogy
150 Trumbull Street, 4th Floor
Hartford, CT 06103

Re: Project: Solar Installation on Dollar Tree Distribution Facility
 Site: 99 International Drive, Windsor, CT
 BL Project No.: 2101952

Dear Mr. Perry:

We have reviewed the available structural drawings for the building located at the above-mentioned address as it relates to the installation of solar panels on the existing roofs, as well as having performed field verification of the structural framing and below-deck components. The roof design is metal deck on open-web steel joists supported by open-web joist girders, which is typical construction for buildings of this nature. A portion of the roof (Area "A") was designated for future solar with higher capacity joists in that area.

As it is not the intention to modify the Snow Load capacity, we calculated that actual in-place Dead Load of the roof construction, such as roofing, insulation, structural metal deck, structural joists, MEP components and ceilings that are hung from the roof structure. The difference between the calculated actual load and the published joist capacities will result in a "reserve capacity" which will be utilized for the weight of the solar arrays. It is noted that the structure was originally designed for a snow load of 35psf, although the code requirement is 30psf. The original design snow load of 35psf was used in our analysis. The following indicates our calculated existing dead load weights:

<u>Description</u>	<u>Actual Loads</u>
Roofing, Insulation & Metal Deck	5.5 psf
Joists	3.0 psf
Mech., Elec., Plumbing, Sprinklers & Misc.	4.0 psf
Actual Dead Load Subtotal:	12.5 psf
Roof Snow Load (Bar Joists):	35 psf
Roof Snow Load (Girders):	35 psf

Based on our structural analysis utilizing the Connecticut State Building Code with its referenced standards, it is our opinion that there is capacity in the existing roof structure of the building to accommodate the addition of strategically-placed attached solar arrays with subarray weights of up to 7.0 pounds per square foot in Area “A” and 4.5 pounds per square foot in Area “B”, without diminishing the snow load capacity.

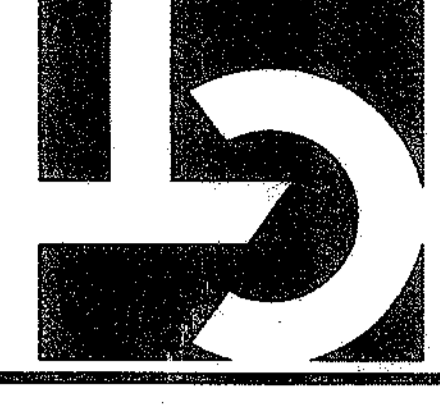
If you should have any further comments or questions regarding this project, please do not hesitate to contact me.

Sincerely,
BL COMPANIES, INC.

Christopher J. Albino, PE
Manager, Structural Engineering
Principal

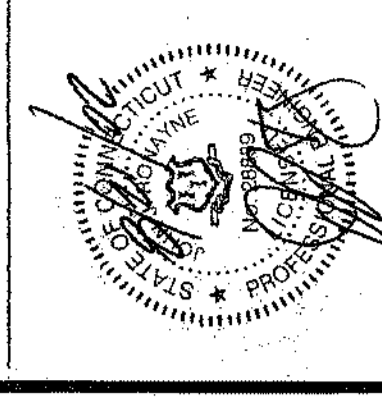


Attachment: Roof Area Map



OVERALL ROOF FRAMING PLAN

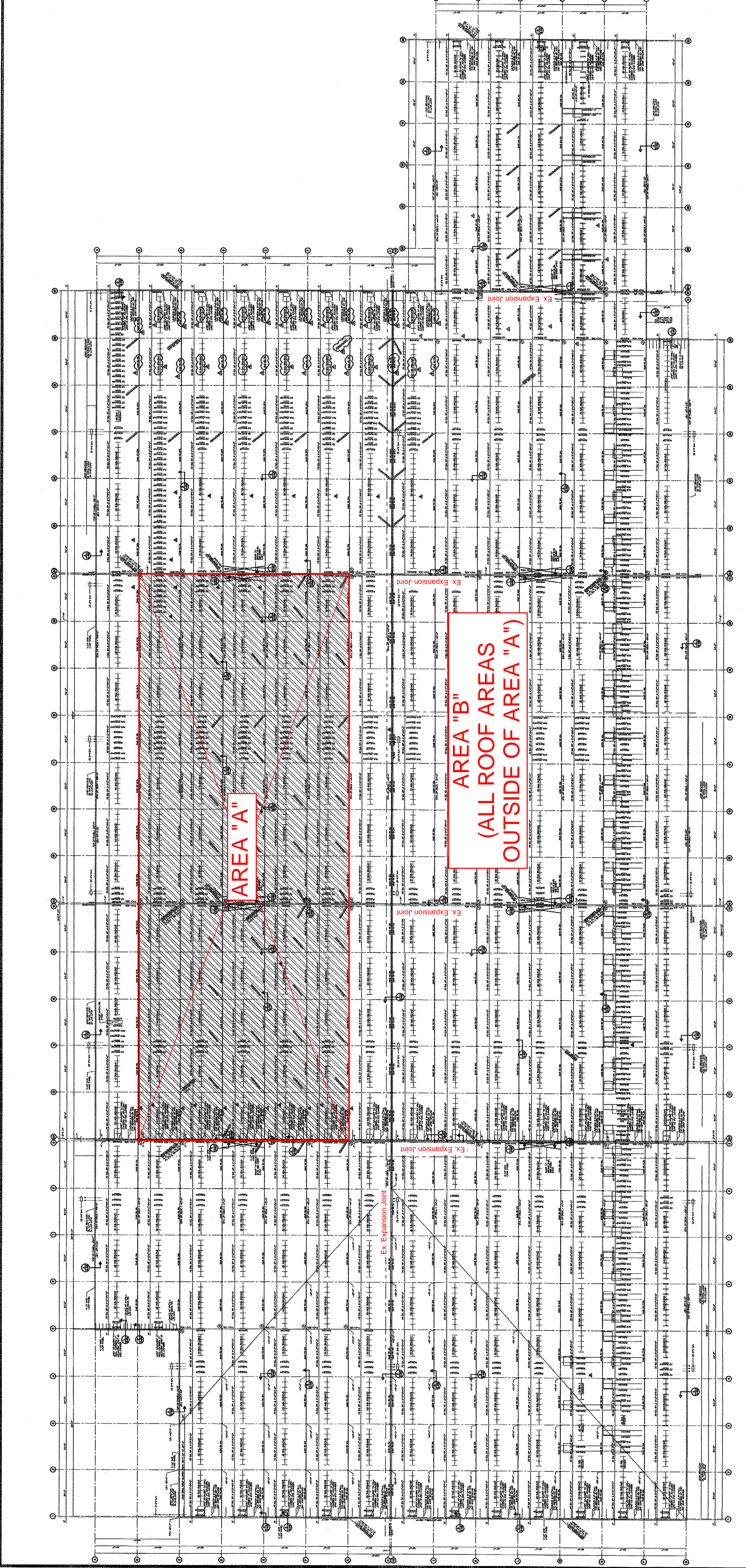
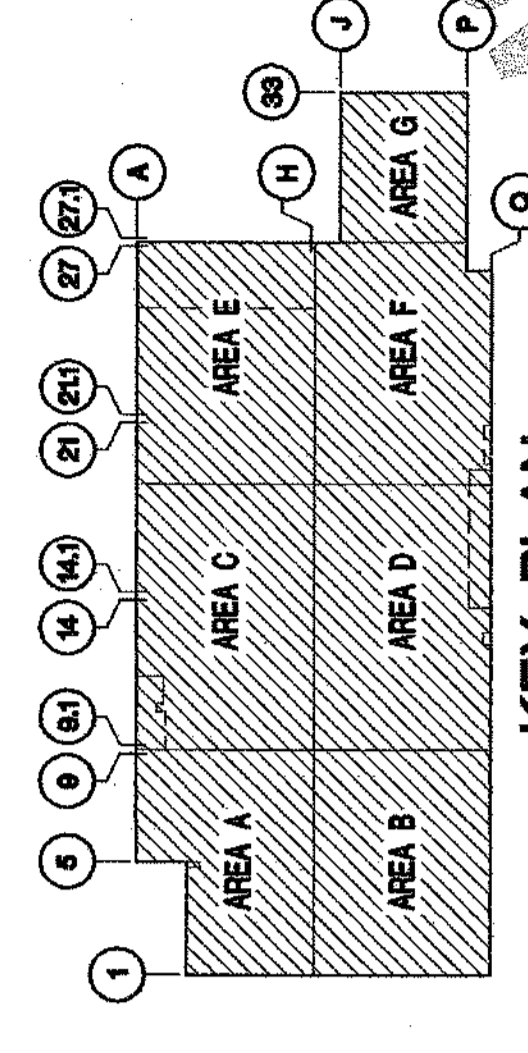
NEW BUILDING FOR
 DOLLAR TREE DISTRIBUTION, INC.
 DISTRIBUTION CENTER NO. 10 - CONNECTICUT



ISSUED FOR: PERMIT CONSTRUCTION
 REVISION 4
 DATE: 06/01/2012
 MARK: 08/21/2012

S-200
 11103

C-012
 Received
 August 23, 2012
 Clancy & Theys
 Construction Co.



OVERALL ROOF FRAMING PLAN 1"=50'-0"

- NOTES**
1. PROVIDE STANDARD STEEL JOIST CAMBER EXCEPT AS NOTED ON THE PLAN.
 2. TOP OF JOIST (INSIDE OF DECK SHOWN THIS (BY) DECK AT RIDGE = +45'-0")
 3. JOIST GIRDER SEAT DEPTH = 1 1/2"

- LEGEND**
- J.B. - INDICATES JOIST BEARING ELEVATION
 - T.O.P. - INDICATES TOP OF PANEL ELEVATION
 - ▲ - INDICATES MOMENT CONNECTION BETWEEN THE JOIST OR JOIST GIRDERS AND THE COLUMN. RE: JOIST/GIRDER MOMENT SCHEDULE ON SHEET S-20
 - K- INDICATES COLLATERAL DEAD LOAD IN ADDITION TO THE TYPICAL PANEL POINT LOAD TO BE SUPPORTED BY THE JOIST GIRDER
 - T-C# - INDICATES INFACTORED LATERAL LOAD IN TENSION OR COMPRESSION
 - ⊕ - INDICATES JOIST TIE. RE: SECTION J5-100
 - S.M. - INDICATES SPRINKLER MAIN
 - ▨ - INDICATES SOLAR PANELS LOCATION

- ROOF JOIST REACTIONS FOR PANEL. DESIGN ARE SHOWN ON SHEETS S-201**
1. ROOF JOIST REACTIONS FOR PANEL. DESIGN ARE SHOWN ON SHEETS S-201
 2. SEE EQUIPMENT PLATFORM PLAN SHEETS S-212, S-214 & S-215
 3. REFER TO SHEET S-220 FOR DECK TYPE AND ATTACHMENT
 4. REFER TO SHEET S-220 FOR DECK TYPE AND ATTACHMENT
 5. MINIMUM TOP CHORD JOIST THICKNESS 3/8" AT ALL COLLECTOR JOISTS

- ADDED LOADS FOR CONVEYORS, ROOF TOP FANS, SPRINKLER MAINS AND SOLAR PANELS. VERIFY LOCATION AND LOADS FOR THIS EQUIPMENT PRIOR TO JOIST FABRICATION.**
1. ADDED LOADS FOR CONVEYORS, ROOF TOP FANS, SPRINKLER MAINS AND SOLAR PANELS. VERIFY LOCATION AND LOADS FOR THIS EQUIPMENT PRIOR TO JOIST FABRICATION.

KEY PLAN
 N.T.S.