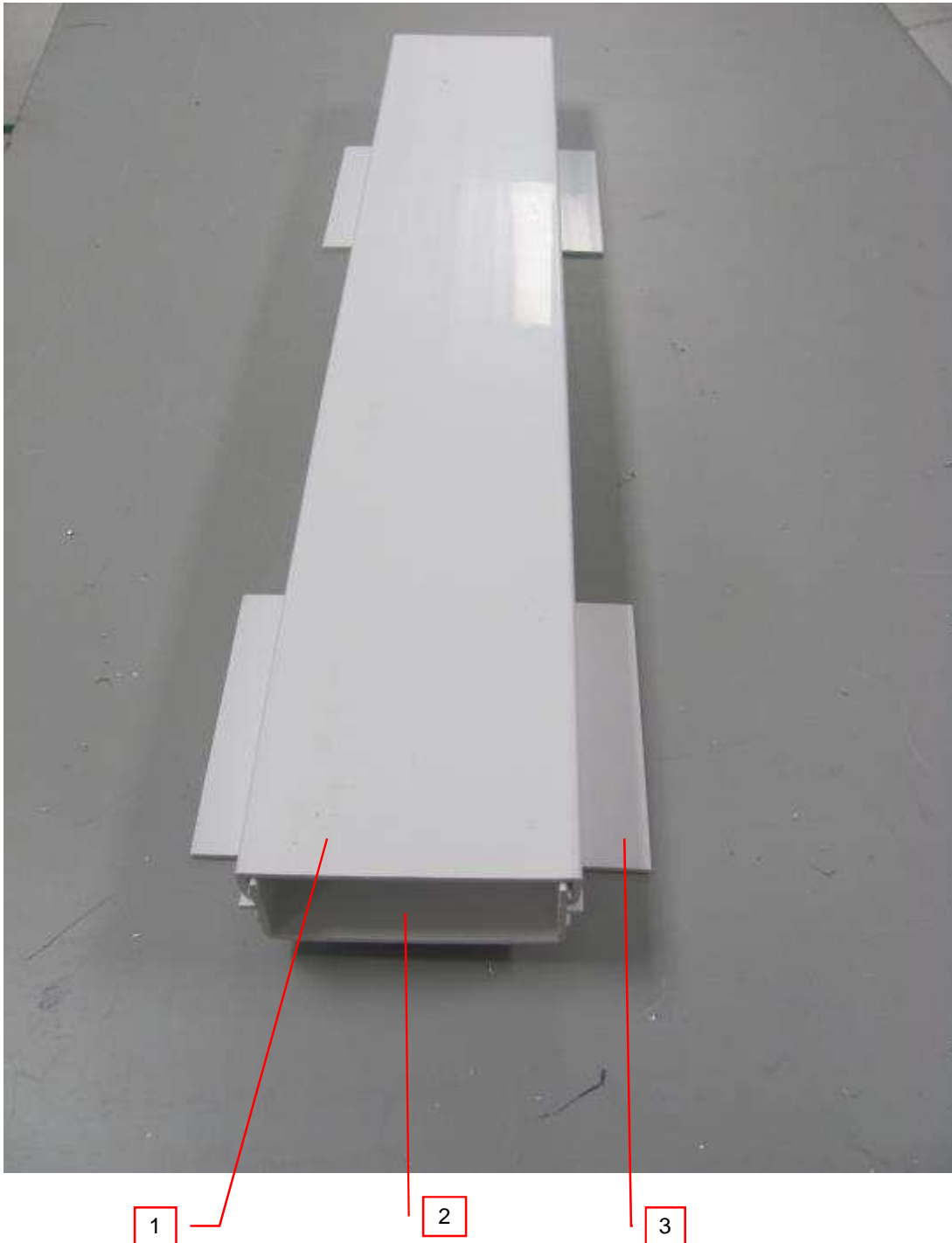


1.0 Reference and Address			
Report Number	100817284LAX-003	Original Issued: 19-Mar-2014	Revised: 10-Nov-2016
Standard(s)	UL 870 Issued: 2008/06/06 Ed:8 UL Standard for Safety Wireways, Auxiliary Gutters, and Associated Fittings		
Applicant	<u>Solar Energy Systems, LLC</u>	Manufacturer	Fram Trak Industries
Address	1205 Manhattan Ave. Suite 1210 Brooklyn, NY 11231	Address	205 Hallock Ave. Middlesex, NJ 08805
Country	USA	Country	USA
Contact	David Buckner or Christopher Moustakis	Contact	Albert Santelli Sr. or Carol McNulty
Phone	(917) 848-0215 or (718) 389-1545 ext. 10	Phone	[REDACTED]
FAX	(718) 389-2820	FAX	[REDACTED]
Email	<u>dbuckner@solaresystems.com</u> or <u>cmoustakis@solaresystems.com</u>	Email	[REDACTED]

2.0 Product Description	
Product	Nonmetallic Wireway
Brand name	Solar Energy Systems
Description	<p>The SES RayTray™ is a nonmetallic wireway system designed for use on roofs that utilizes a cap and tray to hold Photovoltaic array cabling. <u>The SES RayTray™ utilizes a base (support) for non-metal roofs to raise the wireway off the ground, while on metal roofs the SES RayTray™ is mounted using either adhesive or bolt and washer hardware.</u></p> <p>Note that product is compliant with all applicable construction clauses in UL 5A.</p>
Models	RayTray and RayTray V2
Model Similarity	RayTray and RayTray V2 are identical except in dimensions, V2 has a greater inside area, increased wire capacity, reduced thickness, height, base, tray, and cap
Ratings	Max support interval: RayTray 4 feet 3 inches, RayTray V2 4 feet. To be used with wire sizes between 6 AWG and 12 AWG. Wire fill ratio 20%, max fill size: RayTray - 1.34in ² , RayTray V2 - 1.684in ² .
Other Ratings	Approved for outdoor use.

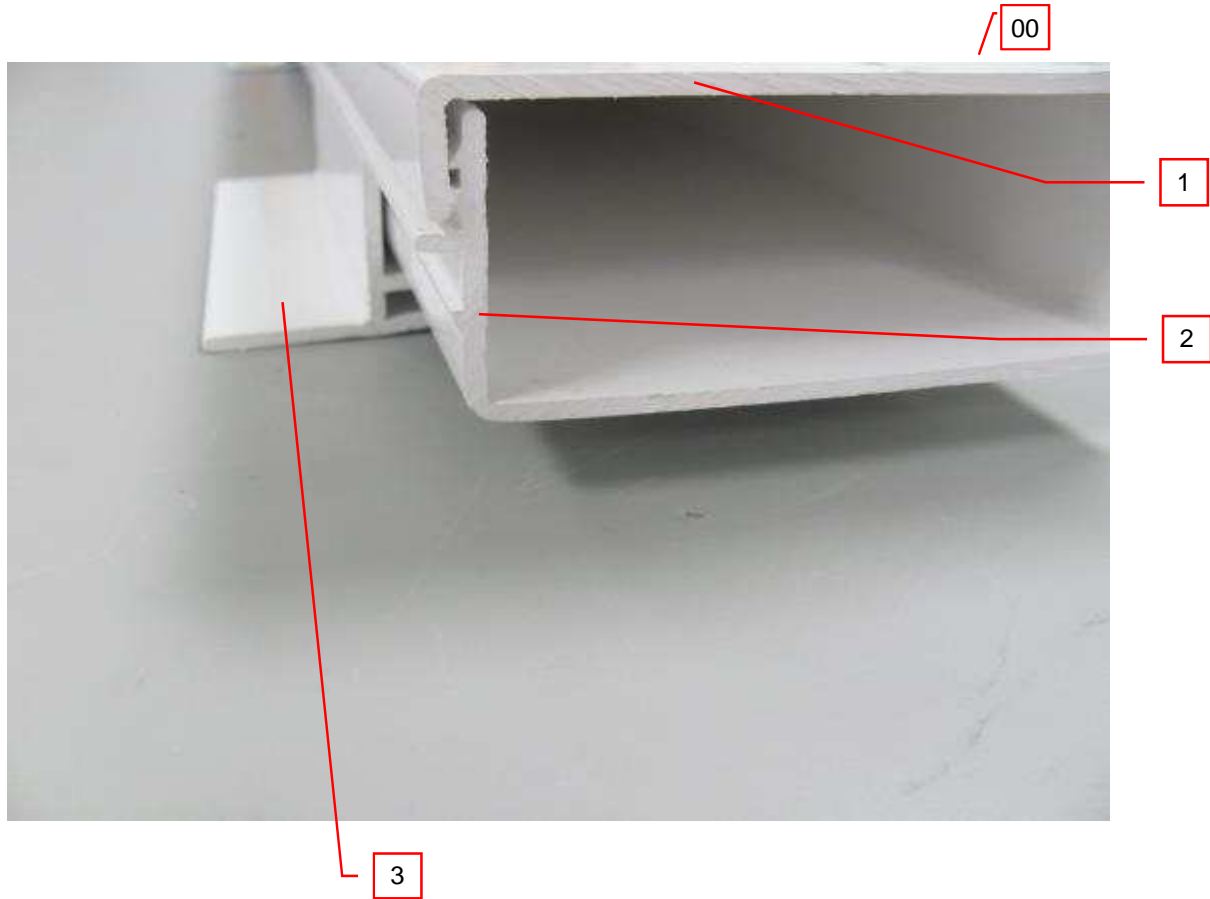
3.0 Product Photographs

Photo 1 - SES RayTray™ and RayTray V2™ Nonmetallic Wireway



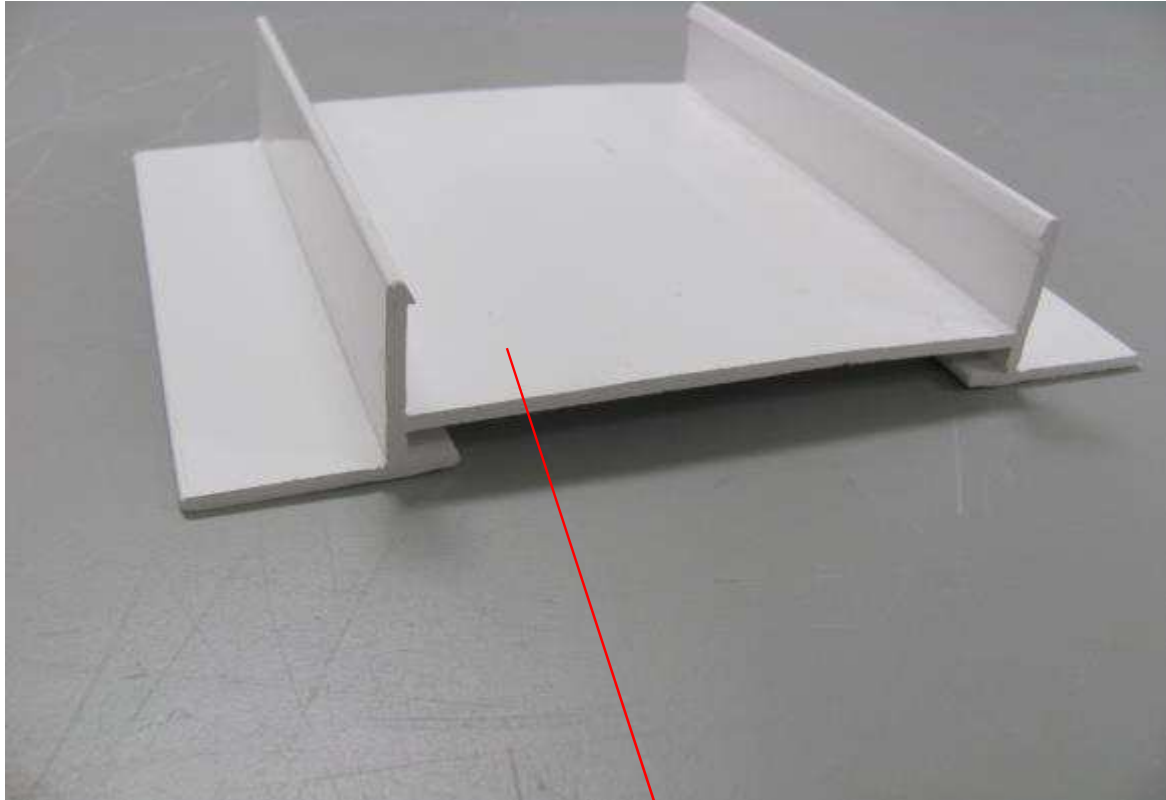
3.0 Product Photographs

Photo 2 - Close up of Connections between Cap, Tray, and Base of RayTray™ and RayTray V2™ Wireway



3.0 Product Photographs

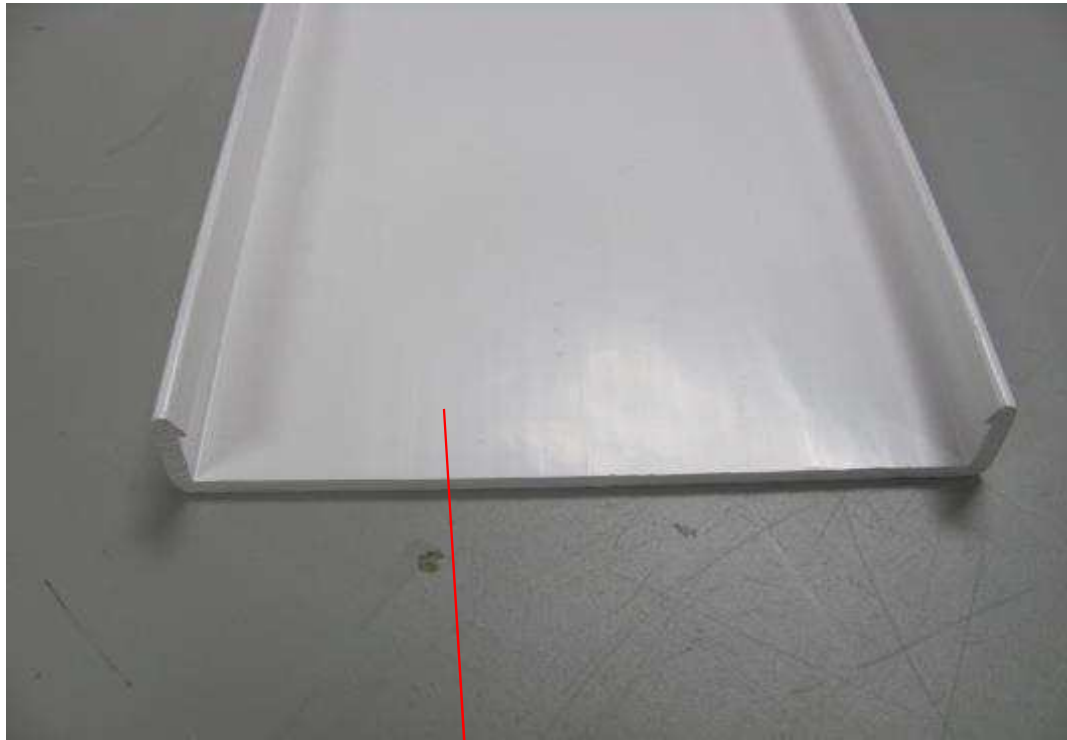
Photo 3 - RayTray™ and RayTray V2™ Wireway Base



3

3.0 Product Photographs

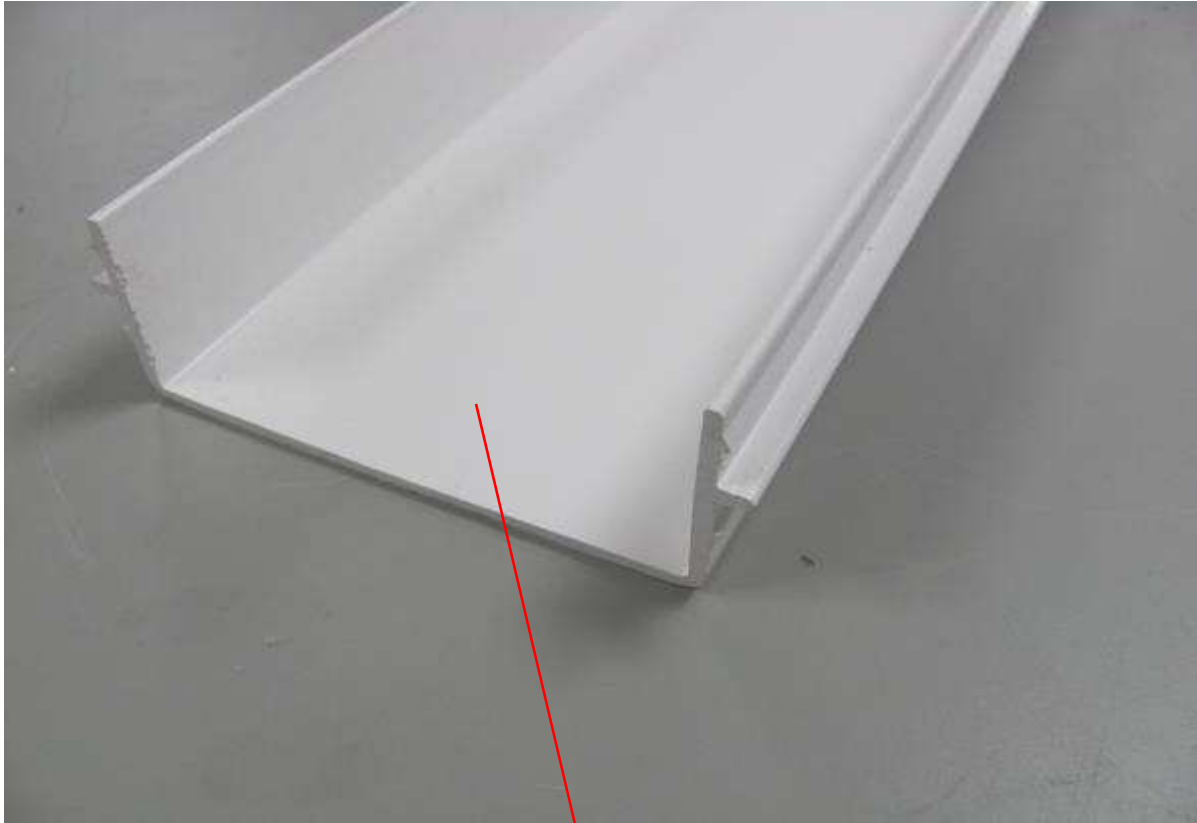
Photo 4 - RayTray™ and RayTray V2™ Wireway Cap



1

3.0 Product Photographs

Photo 5 - RayTray™ and RayTray V2™ Wireway Tray



2

4.0 Critical Components						
Photo #	Item no. ¹	Name	Manufacturer/ trademark ²	Type / model ²	Technical data and securement means	Mark(s) of conformity ³
1, 2, 4	1	Cap	Fram Trak Industries	E7755(f1)	Polymeric material - Geon Vinyl Dry Blend E7755, V-0, 5VA, RTI (Elec & Mech) of 50. Deflection temperature under load: 72.8 °C. See Illustration 1 for dimensions.	cRUus
1, 2, 5	2	Tray	Fram Trak Industries	E7755(f1)	Polymeric material - Geon Vinyl Dry Blend E7755, V-0, 5VA, RTI (Elec & Mech) of 50. Deflection temperature under load: 72.8 °C. See Illustration 2 for dimensions.	cRUus
1, 2, 3	3	Base	Fram Trak Industries	E7755(f1)	Polymeric material - Geon Vinyl Dry Blend E7755, V-0, 5VA, RTI (Elec & Mech) of 50. Deflection temperature under load: 72.8 °C. See Illustration 3 for dimensions.	cRUus
1, 2, 4	4	Cap V2	Fram Trak Industries	E7755(f1)	Polymeric material - Geon Vinyl Dry Blend E7755, V-0, 5VA, RTI (Elec & Mech) of 50. Deflection temperature under load: 72.8 °C. See Illustration 4 for dimensions.	cRUus
1, 2, 5	5	Tray V2	Fram Trak Industries	E7755(f1)	Polymeric material - Geon Vinyl Dry Blend E7755, V-0, 5VA, RTI (Elec & Mech) of 50. Deflection temperature under load: 72.8 °C. See Illustration 5 for dimensions.	cRUus
1, 2, 3	6	Base V2	Fram Trak Industries	E7755(f1)	Polymeric material - Geon Vinyl Dry Blend E7755, V-0, 5VA, RTI (Elec & Mech) of 50. Deflection temperature under load: 72.8 °C. See Illustration 6 for dimensions.	cRUus
<p>NOTES:</p> <p>1) Not all item numbers are indicated (called out) in the photos, as their location is obvious.</p> <p>2) "Various" means any type, from any manufacturer that complies with the "Technical data and securement means" and meets the "Mark(s) of conformity" can be used.</p> <p>3) Indicates specific marks to be verified, which assures the agreed level of surveillance for the component. "NR" - indicates Unlisted and only visual examination is necessary. "See 5.0" indicates Unlisted components or assemblies to be evaluated periodically refer to section 5.0 for details.</p>						

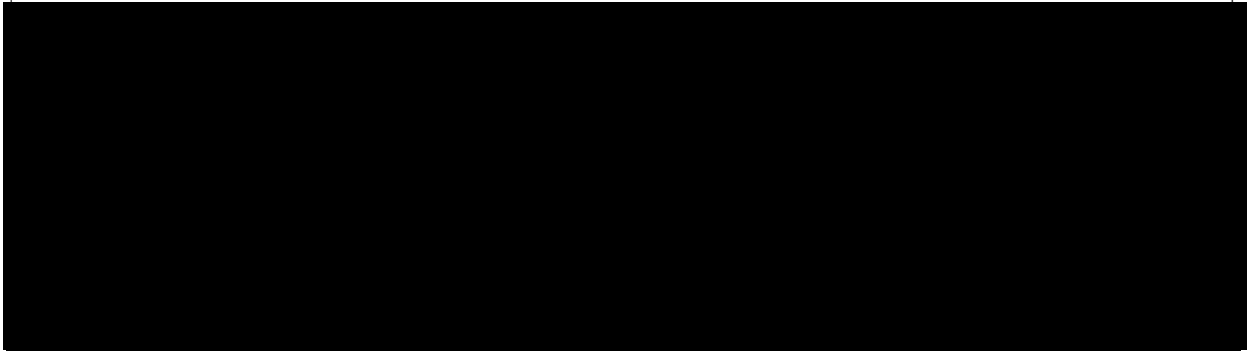
5.0 Critical Unlisted CEC Components

POLYMERIC MATERIALS				
Photo #	Item no.	Name	Manufacturer/Trademark	Type / model
Electrical Rating:				Flame rating
Component Standard used: None				
MATERIALS LIST (refer to illustrations 1-3 for component drawings)				
Components	Manufacturer	Type/model	Dimensions/thickness/assembly information	
VERIFICATION PROCESS				
Frequency:		Test Site:		Number of samples to test: 0
Test Names		Test Parameters		

6.0 Critical Features
<p><u>Recognized Component</u> - A component part, which has been previously evaluated by an accredited certification body with restrictions and must be evaluated as part of the basic product considering the restrictions as specified by the Conditions of Acceptability.</p>
<p><u>Listed Component</u> - A component part, which has been previously Listed or Certified by an accredited Certification Organization with no restrictions and is used in the intended application within its ratings.</p>
<p><u>Unlisted Component</u> - A part that has not been previously evaluated to the appropriate designated component standard. It may also be a Listed or Recognized component that is being used outside of its evaluated Listing or component recognition.</p>
<p><u>Critical Features/Components</u> - An essential part, material, subassembly, system, software, or accessory of a product that has a direct bearing on the product's conformance to applicable requirements of the product standard.</p>
<p><u>Construction Details</u> - For specific construction details, reference should be made to the photographs and descriptions. All dimensions are approximate unless specified as exact or within a tolerance. In addition to the specific construction details described in this Report, the following general requirements also apply.</p>
1. <u>Spacing</u> - Not Applicable
2. <u>Mechanical Assembly</u> - Not Applicable.
3. <u>Corrosion Protection</u> - Not Applicable.
4. <u>Accessibility of Live Parts</u> - Not Applicable.
5. <u>Grounding</u> - Not Applicable.
6. <u>Polarized Connection</u> - Not Applicable.
7. <u>Internal Wiring</u> - To be used with wire sizes between 6 AWG and 12 AWG. Wire fill ratio 20%, max fill size: RayTray - 1.34in ² , RayTray V2 - 1.684in ² .
8. <u>Schematics</u> - Refer to Illustration No(s) 1, 2, and 3 to verify the dimensions of the connecting grooves.
9. <u>Markings</u> - The product is marked at the top surface of cap once per 8 visible linear feet. Marking shall include: "Solar Energy Systems" (brand), "RayTray" or "RayTray V2" (model), ETL mark, Control #, Listed to UL 870, Max Wire Size AWG #6, Max Support Interval: RayTray - 4'3" RayTray V2 - 4'0", Sunlight Resistant, and Manufacture Date. See illustration 5 for RayTray and illustration 11 for RayTray V2 for example of marking label layout.
10. <u>Cautionary Markings</u> - Not Applicable.
11. <u>Installation, Operating and Safety Instructions</u> - Instructions for installation and use of this product are provided by the manufacturer.

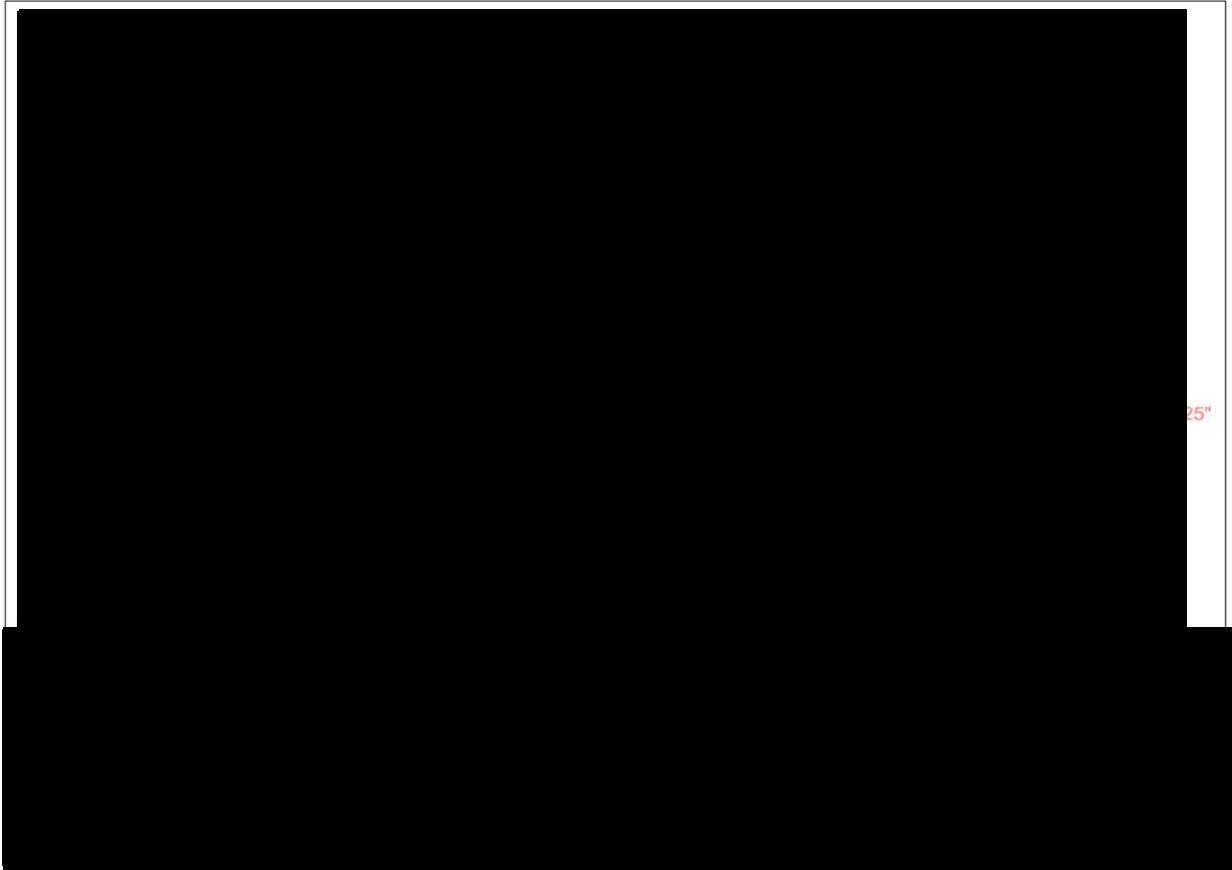
7.0 Illustrations

Illustration 1 - Drawing of Cap



7.0 Illustrations

Illustration 2 - Drawing of Tray




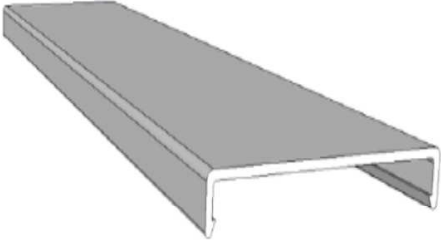
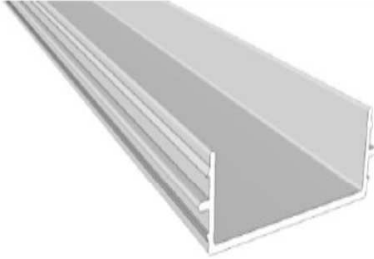
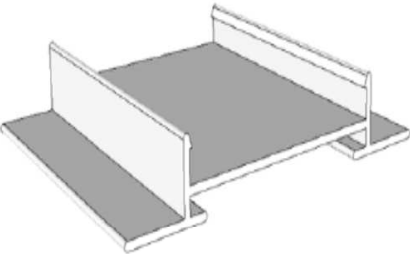
7.0 Illustrations

Illustration 3 - Drawing of Base



7.0 Illustrations


Illustration 4 - RayTray™ Installation Manual

 RayTray™ INSTALLATION MANUAL	
IDENTIFICATION OF COMPONENTS	
 <p>CAP</p>	 <p>TRAY</p>
 <p>BASE (for non-metal roofs)</p>	<p style="text-align: center;">ATTACHMENT HARDWARE (for metal roofs where RayTray™ runs <u>perpendicular</u> to roof seams): 3/8" stainless steel bolt with fender washer</p> <hr/> <p style="text-align: center;">ADHESIVE (for metal roofs where RayTray™ runs <u>parallel</u> to roof seams): PL 400 construction adhesive or equivalent</p>
See drawings WM-00, WM-01, WM-02, and WM-03 for further detail. Material: RPVC XXXXXXXXXX UL-tested UV rating: F1 Infrared Spectroscopy (IR), Thermogravimetry (TGA), and Differential Scanning Calorimetry tests o	
<p><u>MANUFACTURING LOCATION:</u> Fram Trak Industries, 205 Hallock Ave., Middlesex, NJ 08805</p>	

Adhesive or attachment only on pitched metal roofs.

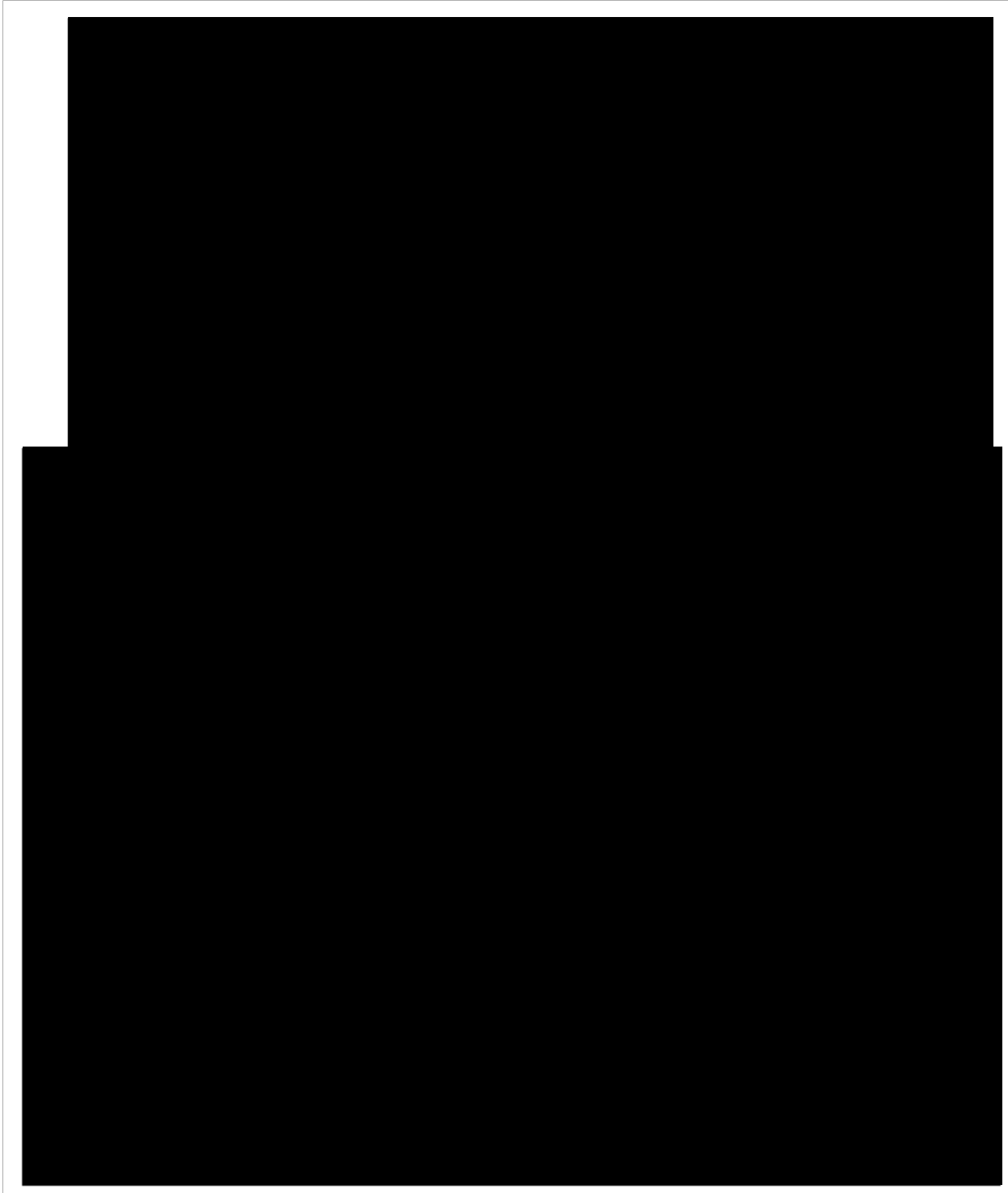
7.0 Illustrations

Illustration 5 - Marking Label RayTray

<p>RayTray™ Sunlight resistant wire management system Cables permitted: RHW, USE, PV Max wire size: AWG #6 Max support interval: 4'-3"</p> <p>Consult manufacturer for proper installation</p>	 <p>Intertek Conforms to UL Std 870 Control No. 4009754</p>
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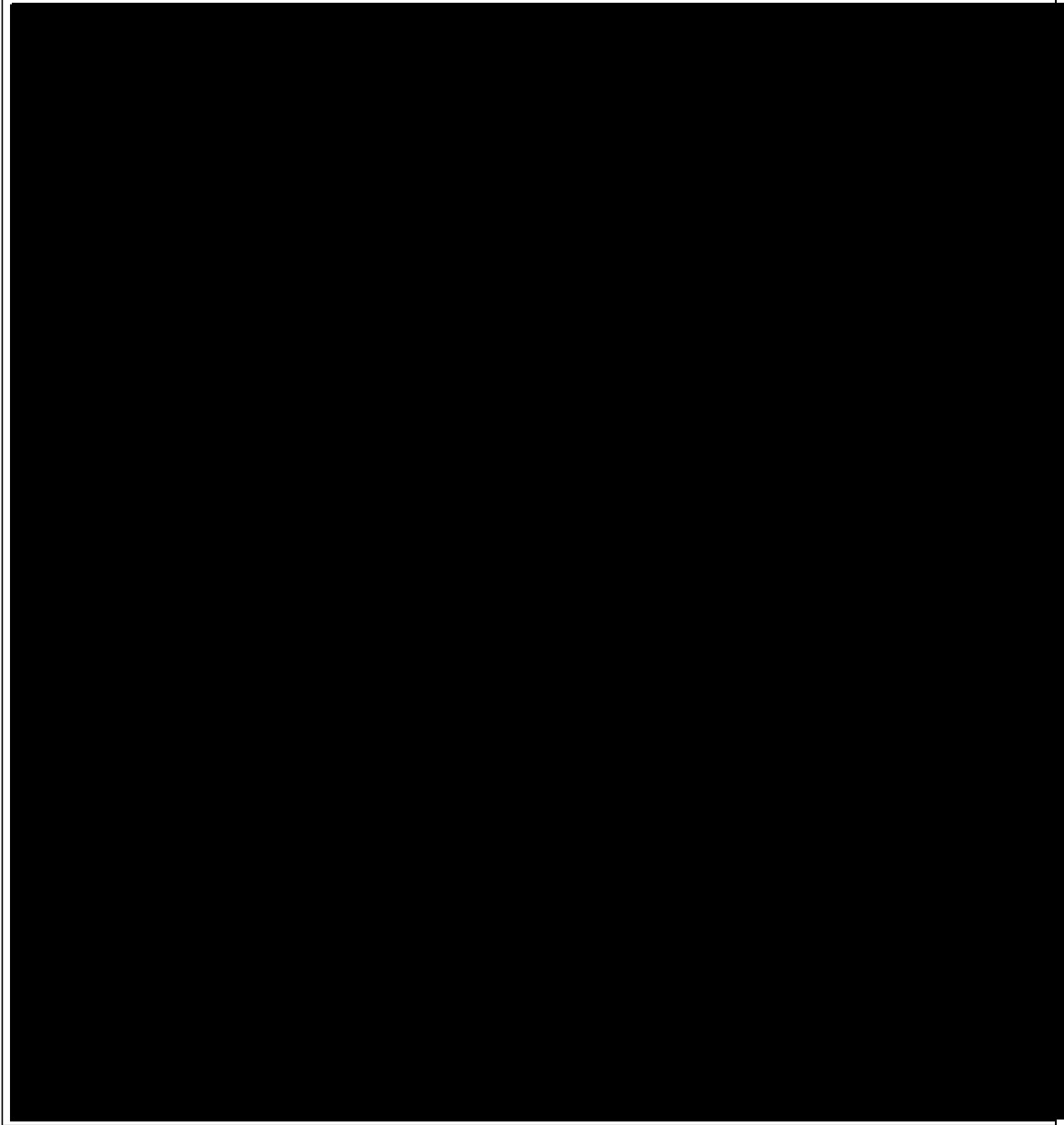
7.0 Illustrations

Illustration 6 - CEC Comps Initial Report



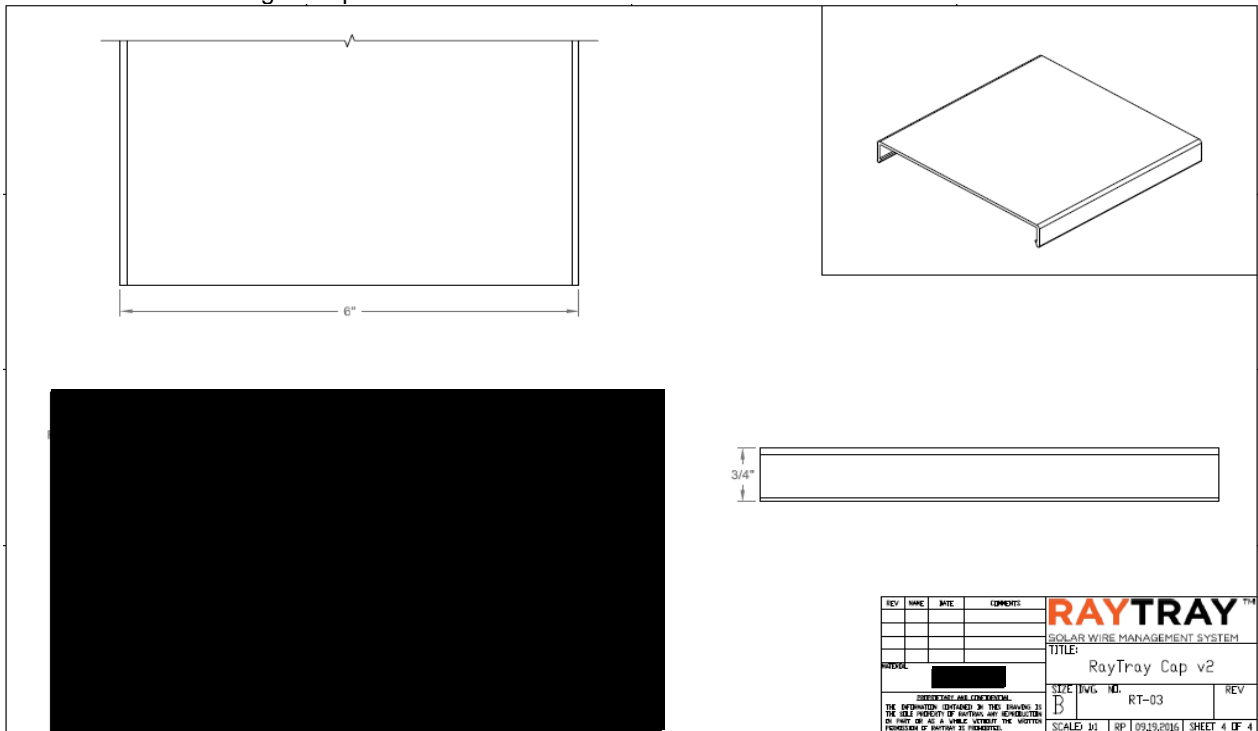
7.0 Illustrations

Illustration 6a - CEC Comps Initial Report (Cont.)



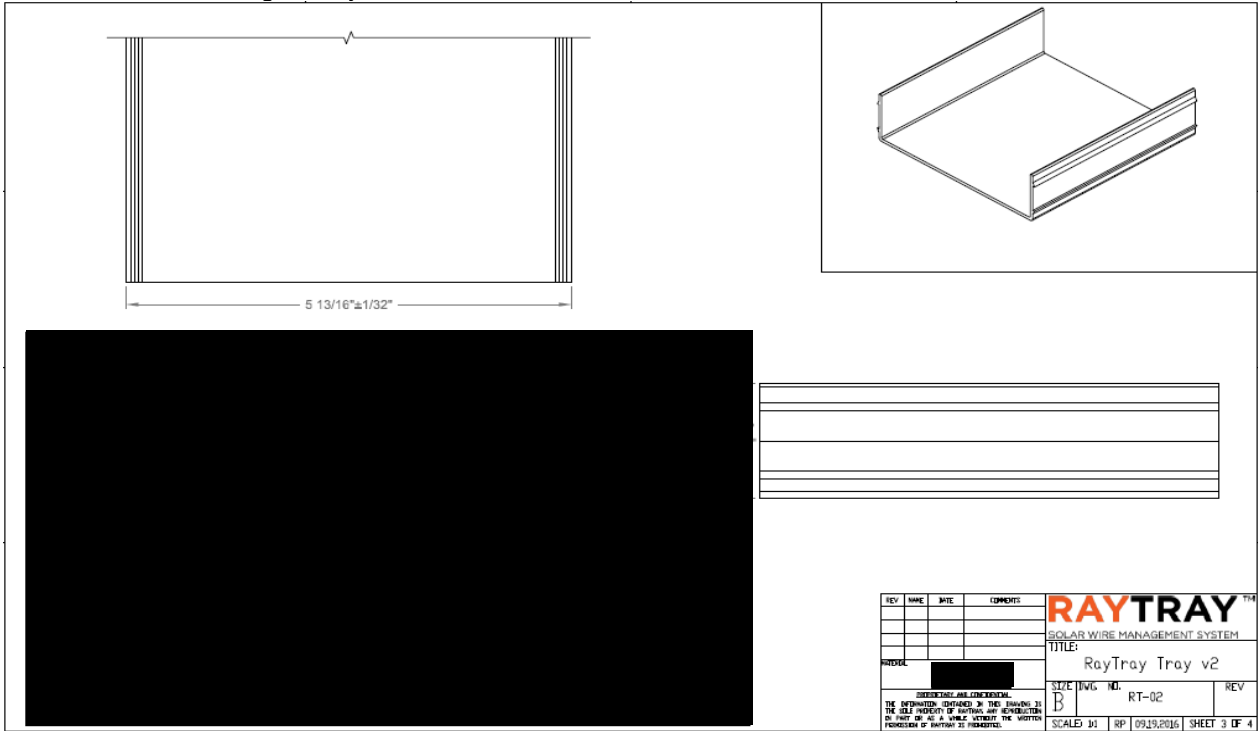
7.0 Illustrations

Illustration 7 - Drawing of Cap V2



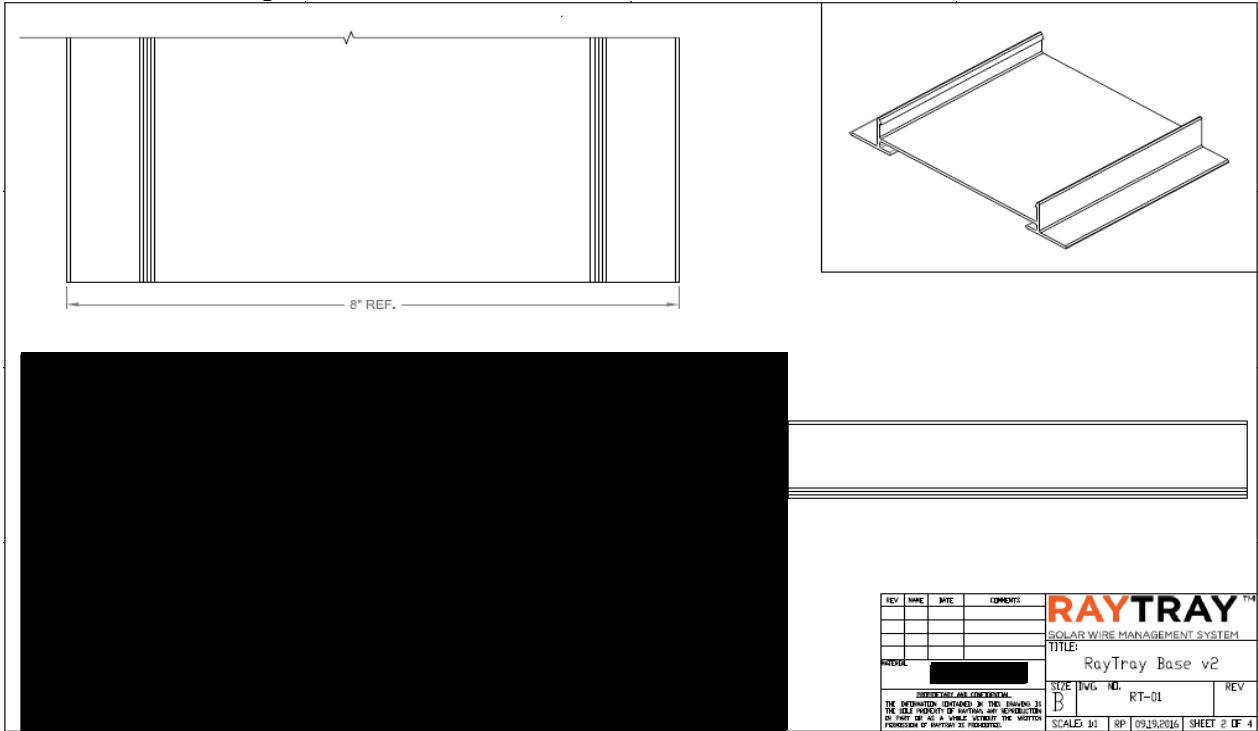
7.0 Illustrations

Illustration 8 - Drawing of Tray V2



7.0 Illustrations

Illustration 9 - Drawing of Base V2



REV	NAME	DATE	COMMENTS

RAYTRAY™
 SOLAR WIRE MANAGEMENT SYSTEM

TITLE:
 RayTray Base v2

DATE: [REDACTED]

SIZE: B
 DWG. NO.: RT-01
 REV: [REDACTED]

SCALE: 3/1 | RP | 09/19/2016 | SHEET 2 OF 4

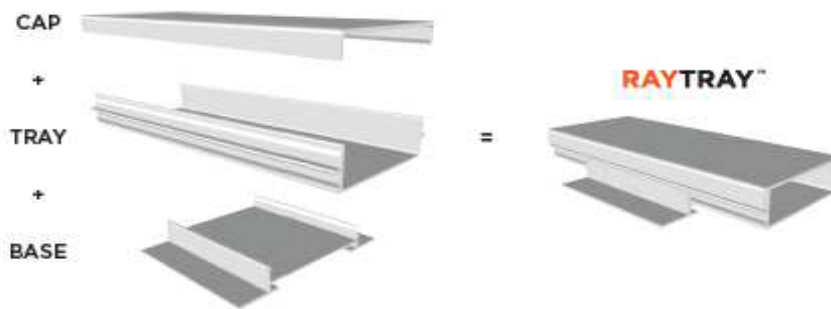
UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES AND DECIMALS THEREOF. DIMENSIONS SHOWN IN THIS DRAWING TAKE PRECEDENCE OVER ANY OTHER DIMENSIONS. THE USER SHALL BE RESPONSIBLE FOR VERIFYING THE ACCURACY OF ALL DIMENSIONS AND SPECIFICATIONS. THE USER SHALL BE RESPONSIBLE FOR OBTAINING THE NECESSARY PERMITS AND APPROVALS FOR THE INSTALLATION OF THIS SYSTEM.

7.0 Illustrations

Illustration 10 - RayTray V2™ Installation Manual

RAYTRAY™
SOLAR WIRE MANAGEMENT SYSTEM

Installation Manual

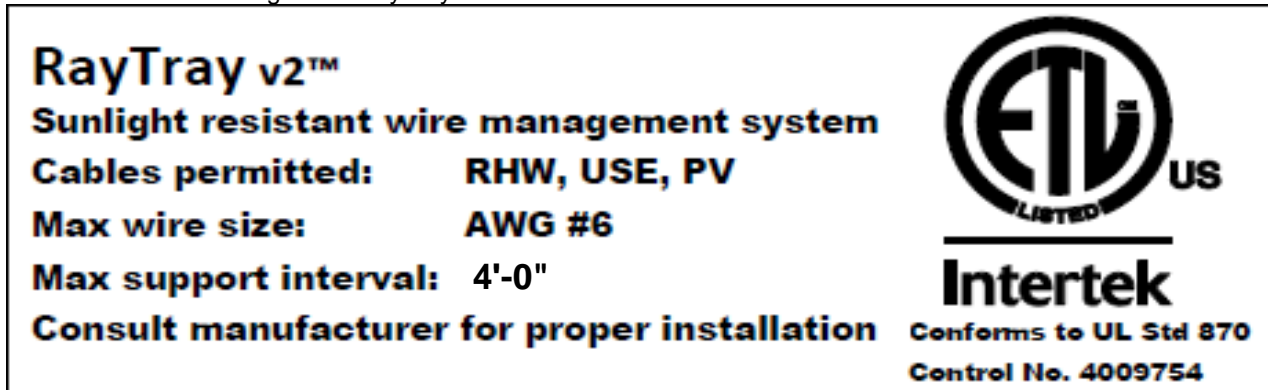


For installation questions:
Email: info@raytraysolar.com
Call: [REDACTED]



7.0 Illustrations

Illustration 11 - Marking Label RayTray V2



8.0 Test Summary			
Evaluation Period	3-Feb-2014 to 28-Feb-2014		Project No. G100817284
Sample Rec. Date	3-Feb-2014	Condition Prototype	Sample ID. LAN1402031020
Test Location	25800 Commercentre Drive, Lake Forest, CA 92630		
Test Procedure	Testing Lab		
Determination of the result includes consideration of measurement uncertainty from the test equipment and methods. The product was tested as indicated below with results in conformance to the relevant test criteria.			
The following tests were performed:			
Test Description	UL 870 Ed. 7 Rev 1999	UL 5A 2003 Ed. 3	
Temperature	--	5.5	
Cold Impact	--	5.11	
Low Temperature Handling	--	5.12	
Mold Stress	--	5.9	
Crush Test	--	5.1	
Support Test	22	--	
8.1 Signatures			
A representative sample of the product covered by this report has been evaluated and found to comply with the applicable requirements of the standards indicated in Section 1.0.			
Completed by:	Roland Moder	Reviewed by:	Jack Shyu
Title:	Engineer	Title:	Staff Engineer
Signature:	<i>Signature on file</i>	Signature:	<i>Signature on file</i>

9.0 Correlation Page For Multiple Listings

The following products, which are identical to those identified in this report except for model number and Listee name, are authorized to bear the ETL label under provisions of the Intertek Multiple Listing Program.

BASIC LISTEE	Solar Energy Systems, LLC
Address	1205 Manhattan Ave. Suite 1210 Brooklyn, NY 11231
Country	USA
Product	Nonmetallic Wireway

MULTIPLE LISTEE 1	None
Address	
Country	
Brand Name	

ASSOCIATED MANUFACTURER	
Address	
Country	

MULTIPLE LISTEE 1 MODELS	BASIC LISTEE MODELS

MULTIPLE LISTEE 2	None
Address	
Country	
Brand Name	

ASSOCIATED MANUFACTURER	
Address	
Country	

MULTIPLE LISTEE 2 MODELS	BASIC LISTEE MODELS

MULTIPLE LISTEE 3	None
Address	
Country	
Brand Name	

ASSOCIATED MANUFACTURER	
Address	
Country	

MULTIPLE LISTEE 3 MODELS	BASIC LISTEE MODELS

10.0 General Information

The Applicant and Manufacturer have agreed to produce, test and label ETL Listed products in accordance with the requirements of this Report. The Manufacturer has also agreed to notify Intertek and to request authorization prior to using alternate parts, components or materials.

COMPONENTS

Components used shall be those itemized in this Intertek report covering the product, including any amendments and/or revisions.

LISTING MARK

The ETL Listing mark applied to the products shall either be separable in form, such as labels purchased from Intertek, or on a product nameplate or other media only as specifically authorized by Intertek. Use of the mark is subject to the control of Intertek.

The mark must include the following four items:

- 1) applicable country identifiers "US" and/or "C" or "US", "C" and "EU"
- 2) the word "Listed" or "Classified" or "Recognized Component" (whichever is appropriate)
- 3) a control number issue by Intertek
- 4) a product descriptor that identifies the standards used for certification. Example:

For US standards, the words, "Conforms to" shall appear with the standard number along with the word, "Standard" or "Std." Example: "Conforms to ANSI/UL Std. XX."

For Canadian standards, the words "Certified to CAN/CSA Standard CXX No. XX." shall be used, or abbreviated, "Cert. to CAN/CSA Std. CXX No. XX."

Can be used together when both standards are used.

Note: A facsimile must be submitted to Intertek, Attn: Follow-up Services for approval prior to use.

The facsimile need not have a control number. A control number will be issued **after signed Certification Agreements** have been received by the Follow-up Services office, approval of the facsimile of your proposed Listing Mark, satisfactory completion of the Listing Report, and scheduling of a factory assessment in your facility.

MANUFACTURING AND PRODUCTION TESTS

Manufacturing and Production Tests shall be performed as required in this Report.

FOLLOW-UP SERVICE

Periodic unannounced audits of the manufacturing facility (and any locations authorized to apply the mark) shall be scheduled by Intertek. An audit report shall be issued after each visit. Special attention will be given to the following:

1. Conformance of the manufactured product to the descriptions in this Report.
2. Conformance of the use of the ETL mark with the requirements of this Report and the Certification Agreement.
3. Manufacturing changes.
4. Performance of specified Manufacturing and Production Tests.

In the event that the Intertek representative identifies non-conformance(s) to any provision of this Report, the Applicant shall take one or more of the following actions:

1. Correct the non-conformance.
2. Remove the ETL Mark from non-conforming product.
3. Contact the issuing product safety evaluation center for instructions.

10.1 Evaluation of Unlisted Components

Because Unlisted Components are uncontrolled, and they do not fall under a third party follow up program, Intertek may require these components to be tested and/or evaluated at least once annually, more often for certain components, as part of the independent certification process. The Unlisted Components in Section 5.0 require testing and/or evaluation as indicated.

Note to Intertek Follow Up Inspector: The Component Evaluation Center, CEC, will notify you in writing when these components must be selected and sent to the CEC for re-evaluation

Ship the samples to:

Intertek Testing Services NA Inc.
ETL Component Evaluation Center
45000 Helm Street, Suite 150
Plymouth Twp., MI 48170 USA
Attn: Component Evaluation Center

Sample Disposition: Due to the destructive nature of the testing, all samples will be discarded at the conclusion of testing unless, the manufacturer specifically requests the return of the samples. The request for return must accompany the initial component shipment.

11.0 Manufacturing and Production Tests

The manufacturer agrees to conduct the following Manufacturing and Production Tests as specified:

Required Tests

None.

12.0 Revision Summary				
The following changes are in compliance with the declaration of Section 8.1:				
Date/ Proj # Site ID	Project Handler/ Reviewer	Section	Item	Description of Change
1-Apr-2014	A. Johnson	1	-	Updated applicant address from 1205 Manhattan Ave., Brooklyn, NY 11222 to 1205 Manhattan Ave., Suite 1210, Brooklyn, NY 11222
NONBILLCERT	L. Watkins			
20-Mar-2015	A. Koretoff A.Kacel	1	-	Updated applicant contact from Ray Panchari to David Buckner or Christopher Moustakis. Updated contact phone number from (718) 389-1545 to (917) 848-0215. Updated email address from jmac@solareshystems.com to duckner@solareshystems.com or cmoustakis@solareshystems.com. Added Fax Number
G102049918LAX		1	-	Updated Manufacturer contact to include Carol McNulty. Added email address cmcnulty@framtrak.com
		2	Desc	Revised product name from "Sun Duct" to "RayTray™"
		2	Model	Revised model name from "Sun Duct" to "RayTray™"
		3	1,2,3, 4,5	Where the word "Sun Duct" previously appeared, that name was replaced by "RayTray™"
		4	1,2,3	Revised manufacturer from "POLYONE Corp" to "Fram Trak Industries)
		5	-	Revised material manufacturer name from "Polyone Corp" to "Fram Trak Industries"
		6	Markings	Revised "SunDuct" to "RayTray™"
		7	4	Revised Illustration from "Installation Manual" to "RayTray™ Installation Manual". Updated Illustration
7		5	Updated marking label illustration with current marking label.	
10-Nov-2016	A. Steiner	2	-	Added "RayTray V2" to Model
		2	-	Added "RayTray and RayTray V2 are identical except in dimensions, V2 has a greater inside area, increased wire capacity, reduced thickness, height, base, tray, and cap" to similarities
		2	-	In ratings section changes "Max support interval of 4 feet 3 inches. To be used with wire sizes between 6 AWG and 12 AWG with wire fill size no larger than 1.34 in²." to "Max support interval: RayTray 4 feet 3 inches, RayTray V2 4 feet. To be used with wire sizes between 6 AWG and 12 AWG. Wire fill ratio 20%, max fill size: RayTray - 1.34in², RayTray V2 - 1.684in²."
		3	Photo 1	Added "RayTray V2" to the photo description
		3	Photo 2	Added "RayTray V2" to the photo description
		3	Photo 3	Added "RayTray V2" to the photo description
		3	Photo 4	Added "RayTray V2" to the photo description
		3	Photo 5	Added "RayTray V2" to the photo description
		4	4	Added item 4 "Cap V2"

12.0 Revision Summary				
The following changes are in compliance with the declaration of Section 8.1:				
Date/ Proj # Site ID	Project Handler/ Reviewer	Section	Item	Description of Change
G102796257CR T	<i>Anthony Steiner</i>	4	5	Added item 5 "Tray V2"
	S. Pasternack	4	1	Changed Mark of conformity from "See 5.0" to "cRUus"
		4	2	Changed Mark of conformity from "See 5.0" to "cRUus"
		4	3	Changed Mark of conformity from "See 5.0" to "cRUus"
		4	4	Changed Mark of conformity from "See 5.0" to "cRUus"
		4	5	Changed Mark of conformity from "See 5.0" to "cRUus"
		4	6	Changed Mark of conformity from "See 5.0" to "cRUus"
		5	-	Removed all testing, not required, plastic is UL certified
	<i>SAP</i>	6	7	Removed "To be used with wire sizes between 6 AWG and 12 AWG with wire fill size no larger than 1.34 in ² ." Added "To be used with wire sizes between 6 AWG and 12 AWG. Wire fill ratio 20%, max fill size: RayTray - 1.34in ² , RayTray V2 - 1.684in ² ."
		6	9	Added "RayTray V2" to model, removed "See illustration 5 for example of marking label layout.", and added "See illustration 5 for RayTray and illustration 11 for RayTray V2 for example of marking label layout.", changed "Max Support Interval: 4'3" " to "Max Support Interval: RayTray - 4'3" RayTray V2 - 4'0" "
		7	5	Added "RayTray" to title
		7	7	Added illustration 7 for Cap V2
		7	8	Added illustration 8 for Tray V2
		7	9	Added illustration 9 for Base V2
		7	10	Added illustration 10 for RayTray V2™ Installation Manual
	7	11	Added illustration 11 for Marking Label RayTray V2	