



# Descriptive Report and Test Results

**MASTER CONTRACT:** 266909

**REPORT:** 70131735

**PROJECT:** 80096297

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Issued by Michael Hoffnagle

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## **PRODUCTS**

CLASS - C531302 - POWER SUPPLIES - PHOTOVOLTAICS-PV Racking and clamping systems  
CLASS - C531382 - POWER SUPPLIES - PHOTOVOLTAICS-PV Racking and clamping systems -  
Certified to US Standards

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34 Bunsen, Irvine, CA, U.S.A. 92618  
Telephone: 949.733.4300 1.800.463.6727 Fax: 949.733.4320 [www.csagroup.org](http://www.csagroup.org)

Models:	SM	-	SOLARMOUNT Flush-to-Roof is an extruded aluminum rail PV racking system that is installed parallel to the roof in landscape or portrait orientations.
	ULA	-	Unirac Large Array is a ground mount system using the SolarMount (SM) platform for the bonding and grounding of PV modules.

**Solarmount**

The system listed is designed to provide bonding/grounding, and mechanical stability for photovoltaic modules. The system is secured to the roof with the L-Foot components through the roofing material to building structure. Modules are secured to the racking system with stainless steel or aluminum mid clamps and Aluminum end clamps. The modules are bonded to the racking system with the stainless-steel bonding mid clamps with piercing points. The system is grounded with 10 AWG copper wire to bonding/grounding lugs. Fire ratings of Class A with Type 1, 2, 3, 10, 19, 22 or 25 for steep slope. Tested at 5” interstitial gap which allows installation at any stand-off height.

The grounding of the system is intended to comply with the latest edition of the National Electrical Code, to include NEC 250 & 690. Local codes compliance is required, in addition to national codes. All grounding/bonding connections are to be torqued in accordance with the Installation Manual and the settings used during the certification testing for the current edition of the project report.

The system may employ optimizers/micro-inverters and used for grounding when installed per installation instructions.

UL 2703 Mechanical Load ratings:

Downward Design Load (lb/ft <sup>2</sup> )	113.5
Upward Design Load (lb/ft <sup>2</sup> )	50.7
Down-Slope Load (lb/ft <sup>2</sup> )	16.13

Test Loads:

Downward Load (lb/ft <sup>2</sup> )	170.20
Upward Load (lb/ft <sup>2</sup> )	76.07
Down-Slope Load (lb/ft <sup>2</sup> )	24.2

**Unirac Large Array**

ULA is a ground mount system using the SolarMount (SM) platform for the bonding and grounding of PV modules. ULA aluminum components merge with SM rails and installer-supplied steel pipe. The SM rail system is secured to the horizontal Pipe using the Rail Bracket components. The Rear and Front cap secures the horizontal Pipe to the vertical Pipe. The Front cap is also used to secure the Cross brace. A Slider is attached to the vertical Pipe to secure the Cross brace. The SM rails, caps, slider, rail brackets, and cross braces materials are 6105-T5 aluminum extrusion. Fasteners materials are 304 stainless steel. Horizontal and vertical pipe materials meet the minimum requirements of ASTM A53 for galvanized steel pipe in 2” and 3” diameter.

The mechanical load ratings from the SM test data will be applied to the ULA model.

Fire Testing is not applicable due to being a ground mount system.

The grounding of the system is intended to comply with the latest edition of the National Electrical Code, to include NEC 250 & 690. Local codes compliance is required, in addition to national codes. All grounding/bonding connections are to be torqued in accordance with the Installation Manual and the settings used during the certification testing for the current edition of the project report.

Models:	RM 5 South	-	South facing, low-slope, ballasted roof-mount PV racking system
	RM DT	-	East-West facing, low-slope, ballasted roof-mount PV racking system

**RM 5 South and RMDT**

The systems listed are designed to provide bonding/grounding, and mechanical stability for photovoltaic modules. The system employs galvanized steel bays, ballasted with ASTM C1491 concrete blocks. Modules are secured to the racking system with stainless steel end and mid clamps. Where applicable, the system may employ fire skirts and/or wind deflectors made from 18 gauge G180 steel. The modules are bonded to the racking system with anodization-piercing clamps. The system is grounded with 10 AWG copper wire to bonding/grounding lugs.

The system may employ bay-mounted or module mounted optimizers/micro-inverters.

Both models are identical in terms of construction material, module clamps, bonding/grounding, and performance rating with the exception of the tilt angle and direction of the systems.

Mechanical ratings for both models:

Module Area up to 27.76 sq ft	
<b>Downward Design Load (lb/ft<sup>2</sup>)</b>	36.2
<b>Upward Design Load (lb/ft<sup>2</sup>)</b>	17.24
<b>Down-Slope Load (lb/ft<sup>2</sup>)</b>	5

Model	GFT	-	Ground Fixed Tilt is a Roll-Formed Steel and extruded aluminum rail PV racking system that is ground mounted in portrait orientation.
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**Ground Fixed Tilt**

The racking system listed is designed to provide bonding/grounding, and mechanical stability for photovoltaic modules. Racking system is secured to the ground with roll-formed steel piles. Modules are secured to the racking system with stainless steel or aluminum mid clamps and Aluminum end clamps. The modules are bonded to the racking system with bonding mid clamps with piercing points. The system is grounded with 10 AWG copper wire to bonding/grounding lugs.

The grounding of the system is intended to comply with the latest edition of the National Electrical Code, to include NEC 250 & 690. Local codes compliance is required, in addition to national codes. All

grounding/bonding connections are to be torqued in accordance with the Installation Manual and the settings used during the certification testing for the current edition of the project report.

The mechanical load ratings from the SM test data will be applied to the GFT model.

Fire Testing is not applicable due to being a ground mount system.

Mechanical ratings:

<b>Downward Design Load (lb/ft<sup>2</sup>)</b>	113.5
<b>Upward Design Load (lb/ft<sup>2</sup>)</b>	50.7
<b>Down-Slope Load (lb/ft<sup>2</sup>)</b>	16.13

Model	NXT Horizon	-	Flush-to-Roof is an extruded aluminum rail PV racking system that is installed parallel to the roof in landscape or portrait orientations.
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**NXT Horizon**

The system listed is designed to provide bonding/grounding, and mechanical stability for photovoltaic modules. The system is secured to the roof with the L-Foot components through the roofing material to building structure. Modules are secured to the racking system with aluminum mid clamps and aluminum end clamps. The modules are bonded to the racking system with bonding mid and end clamps with piercing points. Fire ratings of Class A with Type 1, 2, 3, 10, 19, 22 or 25 for steep slope. Tested at 5” interstitial gap which allows installation at any stand-off height.

The grounding of the system is intended to comply with the latest edition of the National Electrical Code, to include NEC 250 & 690. Local codes compliance is required, in addition to national codes. All grounding/bonding connections are to be torqued in accordance with the Installation Manual and the settings used during the certification testing for the current edition of the project report.

UL 2703 Mechanical Load ratings for tested module area 21.86 sq ft:

<b>Downward Design Load (lb/ft<sup>2</sup>)</b>	113.7
<b>Upward Design Load (lb/ft<sup>2</sup>)</b>	50.7
<b>Down-Slope Load (lb/ft<sup>2</sup>)</b>	15.6

UL 2703 and TIL Mechanical Load ratings tested module area 27.76 sq ft:

<b>Downward Design Load (lb/ft<sup>2</sup>)</b>	50.1
<b>Upward Design Load (lb/ft<sup>2</sup>)</b>	22.2
<b>Down-Slope Load (lb/ft<sup>2</sup>)</b>	8.0

### **Conditions of Acceptability:**

Installation is subject to acceptance of the local inspection authorities having jurisdiction. The certification of these products relates only to the methods of installation, bonding, and grounding as outlined in the Installation Manual for each product.

### **APPLICABLE REQUIREMENTS**

- UL 2703-1st Edition - Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels.
- TIL No. A-40 - Technical Information Letter TIL No. A-40 Covering PV Module and Panel Rack Mounting Systems and Accessories

### **MARKINGS**

The manufacturer is required to apply the following markings:

- Products shall be marked with the markings specified by the particular product standard.
- Products certified for Canada shall have all Caution and Warning markings in both English and French.

Additional bilingual markings not covered by the product standard(s) may be required by the Authorities Having Jurisdiction. It is the responsibility of the manufacturer to provide and apply these additional markings, where applicable, in accordance with the requirements of those authorities.

The products listed are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US (indicating that products have been manufactured to the requirements of both Canadian and U.S. Standards) or with adjacent indicator 'US' for US only or without either indicator for Canada only.

### **SM and ULA markings**

The following markings appear on the rail by adhesive label:

1. Submitter's name and/or CSA Master Contract number "266909";
2. Model designation;
3. Manufacturing date;
4. System fire class rating/designation of information location in Installation Manual;
5. Design load rating/designation of information location in Installation Manual;

The following markings appear on the Mid clamp by stamping:

1. Submitter's name and/or CSA Master Contract number "266909";
2. CSA mark
3. Mil ID for factory location

### **Nameplate adhesive label material approval information:**

SATO AMERICA INC, SF401 DuraMark Polyester, MH48415 - Printing Materials – Component, UL 969-Marking and Labeling Systems

## RM 5 South and RMDT markings

The following markings appear on the ballast bay by permanent stamping:

1. Submitter's name and/or CSA Master Contract number "266909";
2. Model designation;
3. Manufacturing date;
4. System fire class rating/designation of information location in Installation Manual;
5. Design load rating/designation of information location in Installation Manual;

UNIRAC RM SOUTH 5  
CONFORMS TO UL STD 2703  
PATENT PENDING  
UNIRAC MFR DDDYY



SYSTEM FIRE CLASS RATING: SEE INSTALLATION INSTRUCTIONS FOR INSTALLATION REQUIREMENTS TO ACHIEVE A SPECIFIED SYSTEM FIRE CLASS RATING WITH THIS PRODUCT.

DESIGN LOAD RATING: SEE INSTALLATION INSTRUCTIONS FOR LOADS AND MODULES QUALIFIED FOR USE WITH THIS PRODUCT.



## Nameplate adhesive label material approval information:

Markings applied via permanent stamping to bay.

## GFT markings

The following markings appear on the rail by adhesive label:

1. Submitter's name;
2. Model designation;
3. Manufacturing date;
4. Design load rating/designation of information location in Installation Manual;

The following markings appear on the Mid-clamp by stamping:

4. Submitter's name and/or CSA Master Contract number "266909";
5. CSA mark
6. Mil ID for factory location

**NXT Horizon markings:**

The following markings appear on the rail by adhesive label:

1. Submitter's name;
2. Model designation;
3. Manufacturing date;
4. Design load rating/designation of information location in Installation Manual;

The following markings appear on the Mid-clamp by stamping or in the extrusion profile:

5. Submitter's name and/or CSA Master Contract number "266909";
6. CSA mark
7. Mil ID for factory location



**Nameplate adhesive label material approval information:**

SATO AMERICA INC, SF401 DuraMark Polyester, MH48415 - Printing Materials – Component, UL 969-Marking and Labeling Systems

**ALTERATIONS**

Not Applicable

**FACTORY TESTS**

Not Applicable

**SPECIAL INSTRUCTIONS FOR FIELD SERVICES**

1. Component descriptions marked with either the "(INT)" or "(INT\*)" identifiers may be substituted with other components providing the requirements specified under the notes in the "Description" are complied with.

**COMPONENT SPECIAL PICKUP**

1. Component descriptions marked with the identifier "(CT)" are subject to annual pickup and Conformity Testing.

**DESCRIPTION**

Notes:

1. Component Substitution
  - a) Critical components (those identified by mfr name, cat no), which are NOT identified with either "INT" or "INT\*" are not eligible for substitution without evaluation and report updating
  - b) The term "INT" means a "Certified" and/or "Listed" (or a "Recognized" and/or "Accepted") component may be replaced by one "Certified" and/or "Listed" by another certification organization accredited by the appropriate accreditation body or scheme requirements to the correct standard, for the same application; providing the applicable country identifiers are included and requirements in item "d" below are complied with.
  - c) The Term "(INT\*)" means a "Recognized" and/or "Accepted" component may be replaced by a component that is CSA Certified. The applicable country identifiers shall be included, the requirements in item "d" below as well as any "conditions of suitability" for the component (as recorded in this descriptive report) shall be complied with;
  - d) Components which have been substituted, must be of an equivalent rating, configuration (size, orientation, mounting) and the applicable minimum creepage and clearance distances are to be maintained from live parts to bonded metal parts and secondary parts.
  - e) Substitution of a "Certified" and/or "Listed" component with a component that is "Recognized" or "Accepted" is not permitted without evaluation and report updating.
  - f) Substitution of a "Recognized" and/or "Accepted" component by one that is not CSA Certified is not permitted without a proper evaluation as well as a report update because the Conditions of Acceptance of the original component may be different than the Conditions of Acceptance of the substitute component.



1. The system does not employ a maximum number of modules that can be installed per system.
2. Module Orientation:
  - a. SM & ULA - Portrait or Landscape
  - b. RM5 & DT – Landscape
  - c. GFT – Portrait
  - d. NXT Horizon - Portrait or Landscape
3. The system was evaluated for use with modules up to:
  - a. SM & ULA – 22.20 sq ft
  - b. RM5 & DT – 27.76 sq ft
  - c. GFT - Portrait - 22.20 sq ft
  - d. NXT Horizon – 27.76 sq ft
4. See Table 1 for customer supplied information for SM
5. See Table 2 for customer supplied information for ULA
6. See Table 3 for customer supplied information for RM
7. See Table 4 for customer supplied information for GFT
8. See Table 5 for customer supplied information for NXT Horizon
9. See the attached installation manual for each model installation instructions, and system drawings.

The critical components identified below may be formed at other locations and shipped directly to the construction site provided they are made with the material/coatings identified and conform to the physical dimensions described and shown in their respective illustrations. Physical specimens may not be present at the location where the CSA mark is applied. Location of markings can be found in the Marking section of this report.