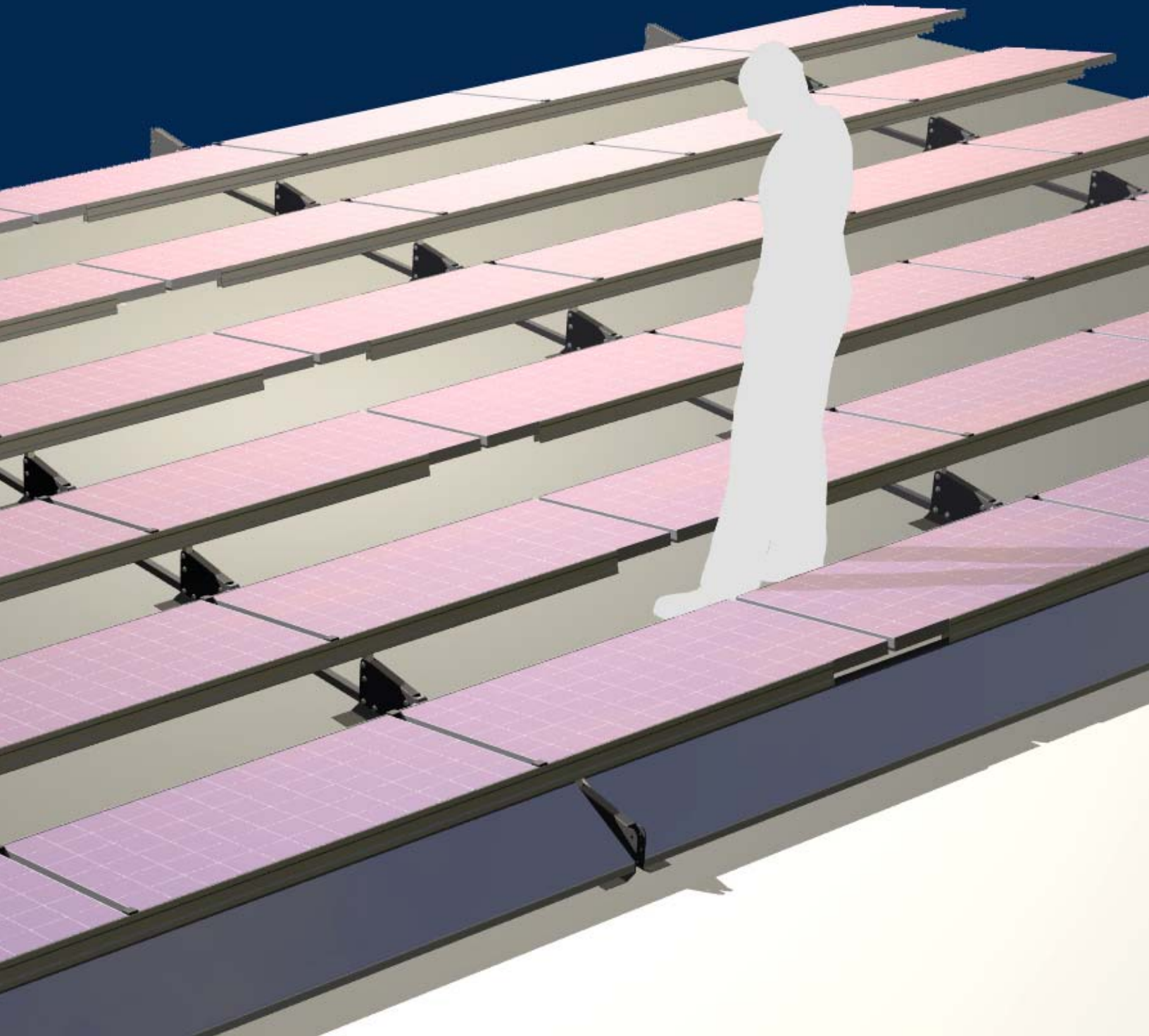


*SunLink*TM

PV MODULE MOUNTING SYSTEM



A product of Eastwood Energy and Solar PowerWorks

Strong but Light

SunLink's unique twin-spar design makes it the only system on the market that substantially enhances the strength of the solar modules it supports. Yet it is lightweight – under 3 lbs per square foot including modules – and has a small footprint for unimpeded water drainage. SunLink fits all major solar modules and can be easily adapted to others. It is rigid enough to be non-penetrating in most cases while flexible enough to conform to uneven roof surfaces.

Versatile

To maximize energy production, SunLink provides for a choice of module tilt angles: 5°, 10°, 15°, or 20°. To facilitate roof access

for maintenance, each “panel” (module row) can be positioned vertically. SunLink can be customized to meet specific project needs, such as to fit difficult roof conditions or to handle extreme wind loading. For example, several SunLink installations in high wind areas apply limited corner ballast.

Easy to Install

SunLink is easy and inexpensive to install. Components are shipped to the job site with detailed installation instructions. No prior training or staging is required. Ease of installation means lower project cost.

Extensively Tested

SunLink has undergone extensive wind

tunnel testing in winds up to 140 mph. SunLink has also undergone certified static load testing up to 50 lbs per square foot.

Built Tough

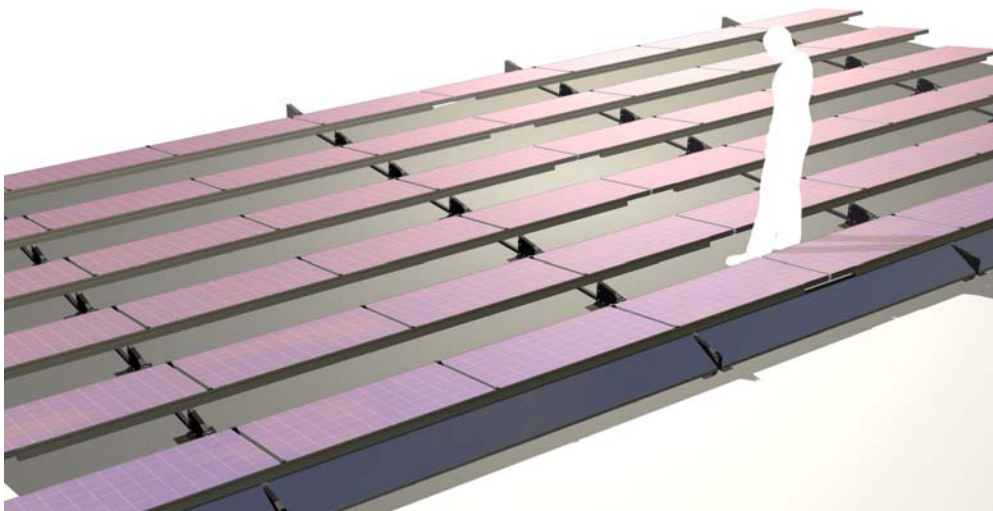
SunLink is made of durable, non-corrosive aluminum.

Guaranteed

SunLink is offered with a 15 year warranty..

Working Closely with Customers

Eastwood Energy prepares customized proposals for SunLink installations. The process starts when the customer sends to an Eastwood designer: 1) A roof plan with dimensions; 2) Project criteria including desired module tilt angle; and 3) As much information as possible about the building, roof, and applicable building codes. Roof details should cover height and surface composition, load limits, design wind speed, and seismic zone. Next, Eastwood's designer provides a preliminary layout of the solar array incorporating the SunLink system. The layout serves as the basis for a budgetary mounting system price and for a discussion between Eastwood's designer and the customer about engineering solutions. Based on this discussion, Eastwood submits a formal written proposal that includes a price quote.



Performance Features

- Allows module tilt angles of 5°, 10°, 15°, or 20°
- Non-penetrating in most applications
- Compatible with all major PV modules
- Conforms to flat roof undulations
- Easy and inexpensive to install
- Light but strong aluminum construction
- Can be customized to meet special needs
- Allows unimpeded roof access and water drainage
- Promotes air circulation to keep modules cool
- Durable – comes with a 15 year warranty

Roof Mounting System

SunLink™
PV MODULE MOUNTING SYSTEM

Tilt Brackets

Tilt brackets control inter-row spacing, support four module panels and provide a versatile interface to the roof. Tilt brackets illustrated to the right are for 10, 15, and 20 degree module tilt angles. SunLink enables concentrated load capacity to be set within building limits by increasing the tilt bracket bearing area. The spacing of the tilt brackets is controlled by the location of the anchor and pivot blocks on the SunLink spars.



4x1 Panel Assembly

SunLink's basic building block is the 4x1 panel (module row) in landscape mode. Two aluminum spars hold the modules together. Anchor and pivot

blocks, installed into the Spar channel, determine tilt bracket spacing and serve as attachment locations. The basic 4x1 panel can be reconfigured to a 3x1 if necessary to fit the system around obstacles on the roof.

SunLink Anti Shadow Spacing

MANUFACTURER	MODULE MODEL	REPEAT SPACING UP TO 42° N. LATITUDE			
		5°	10°	15°	20°
BP	4175, 3160, SX170	38"	43.5"	48.5"	52.5"
GE	GEPV-165-M	47"	54.5"	60.5"	65.5"
KYOCERA	KC187G, KC167G	47.5"	55"	61"	66"
SHARP	ND-205U1, ND-208U1 ND-167U3	47.5"	55"	61"	66"
	NT-175U1, NE165U1	40"	45.5"	51"	55"
SHELL	ULTRA 165-P, 175P	40"	45.5"	51"	55"

NOTES:

1. Repeat spacing is the projected width of the module plus the aisle spacing
2. All modules are in landscape orientation
3. Lateral spacing between modules is 1.25" inches
4. For spacing information on a module not listed please contact SunLink LLC

EXCERPT FROM ILLUSTRATED INSTALLATION INSTRUCTIONS



Figure A - Six saw horses create an elevated assembly platform.

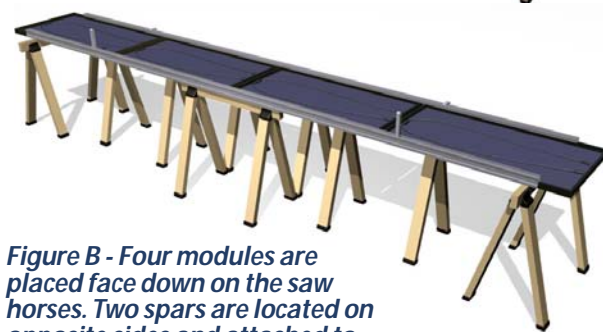


Figure B - Four modules are placed face down on the saw horses. Two spars are located on opposite sides and attached to the modules with stainless steel fasteners.

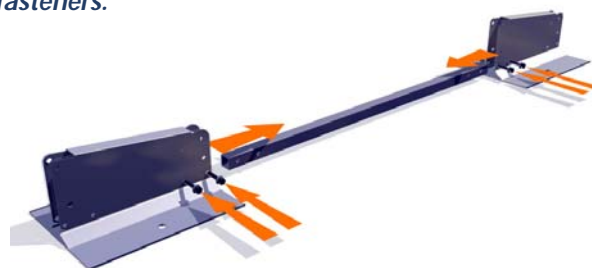


Figure C - Tilt brackets are attached to the links with stainless steel fasteners.

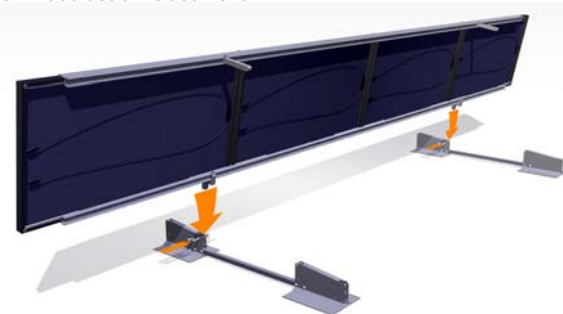


Figure D - 4x1 panel is placed into the southern tilt brackets.

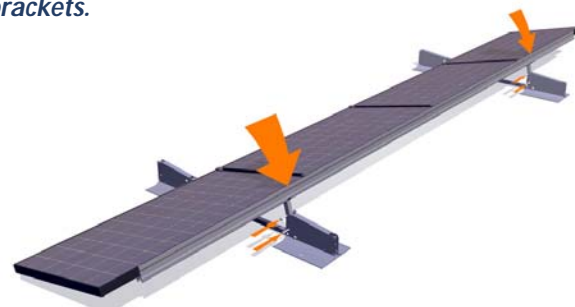
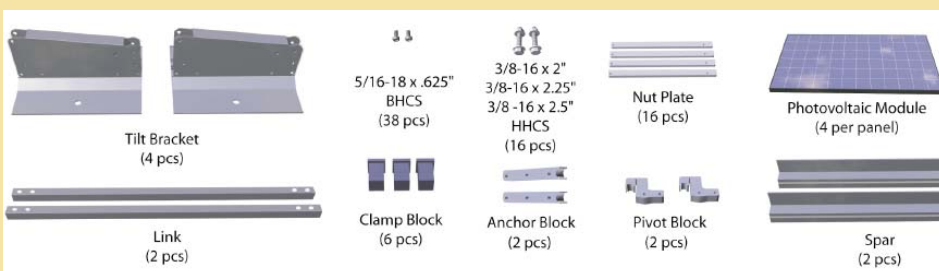


Figure E - 4x1 panel is rotated down onto tilt brackets and attached with stainless steel fasteners.

Materials, Processes & Components

- ASTM B209-04 Aluminum and Aluminum-Alloy Sheet and Plate
- ASTM B221-02 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire Profiles and Tubes
- Module mounting system assembly fasteners are AISI Type 18-8 stainless steel (Group 1) manufactured to ASTM specification or to applicable SAE grade



Roofs, Wind and SunLink

A roof consists of an impervious membrane and its support structure. Most buildings are engineered at the margin of permissible structural design loads. Moreover, the roof membrane has a finite life and wears unevenly. Considering these facts, a practical PV module mounting system incorporates design elements that minimize structural loads and enable efficient installation and removal by a small well-coordinated crew. The system should also allow rapid and inexpensive removal of the system for re-roofing.

SunLink configures arrays for low distributed weight. Bearing loads are low and can be modified if necessary to meet special conditions. An unballasted SunLink system has a distributed weight of <3 lbs per square foot. A system applying corner ballast in order to meet high wind conditions can be kept to a weight of <6 lbs per square foot.

Wind loads on modules and the mounting system consist of lift and drag forces. The lift component acts normal to the plane of the tilted module. The drag component tends to sweep or push objects off the roof, which means that the roof surface coefficient of friction is a significant factor.

In order to understand SunLink's wind performance, Eastwood conducted extensive wind tunnel tests. Quarter scale models were built at each of four tilt angles (5, 10, 15, and 20 degrees) and tested across a range of wind speeds and wind approach (yaw) angles. Initial test data is summarized in Figures 1 and 2. Up to five linked "panels" (module rows) were evaluated in more than one hundred test runs, including some runs in which a wind spoiler or deflector was added in order to gauge its effect in mitigating lift. The data acquisition process

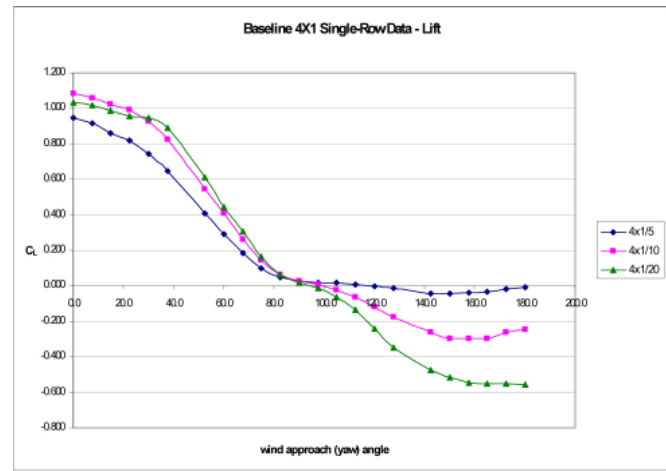


Figure 1- Lift on the panel is reaction lift. At 0° yaw angle, there is no correlation of lift with angle of attack (tilt angle).

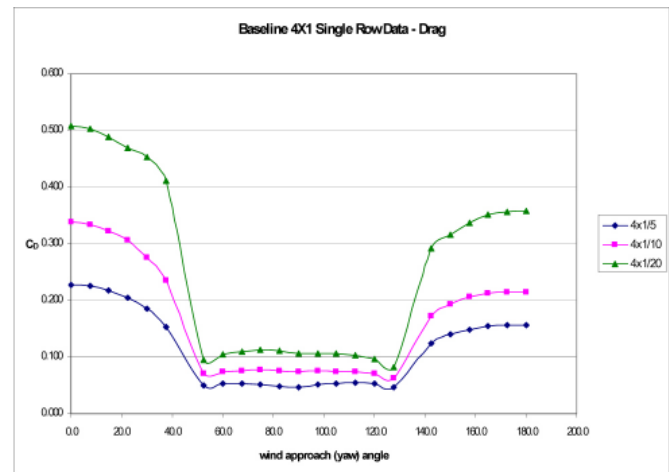


Figure 2 – Drag on the panel is profile drag. At 0° yaw angle, there is a clear correlation of drag with AOA (tilt angle).

focused on determining the effects of row separation and self-shielding. The tests determined that SunLink's architecture reduces lift by a factor of four and drag by a factor of three. Eastwood Energy refined the SunLink architecture based on analysis of the test results. The result is a system that produces dynamic loads that are a fraction of static loads.

SunLink LLC

100 Larkspur Landing Circle, Suite 114

Larkspur, CA 94939

Tel: 415.925.9650 Fax: 415.925.9636

info@sunlinkllc.com

www.sunlinkllc.com

SunLink
PV MODULE MOUNTING SYSTEM