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Roof-Mounted Photovoltaic System Guidelines

Benefits and General Guidelines

The conversion of sunlight into usable electrical power is made possible by the incorporation of a photovoltaic (PV) system. The result is a sustainable platform of long-term energy independence while reducing environmental impact.

Equipping a Duro-Last® roofing system with a PV system also creates additional responsibilities: increased foot traffic, additional loads, and design considerations for inspections, maintenance and repair. There are various types of photovoltaic systems on the market, and it's recommended that the installer match the particular Duro-Last roofing system to the appropriate PV system.

The technical information provided in this bulletin comes from *Guidelines for Roof Mounted Photovoltaic System Installations*, published by the National Roofing Contractors Association (NRCA).

PV System Rooftop Assessment

Membrane condition and installation details should be assessed by a design professional or solar integrator/installing contractor prior to determining if a PV system should be installed.

1. The typical lifespan of a PV system is between 20 and 25 years. A PV system should not be installed on an existing Duro-Last roofing system that is older than 5 years and where the membrane is less than 50-mil in thickness.
2. In addition to general inspections, maintenance, and repairs of rooftop areas, access to PV arrays for operation, service, and maintenance requires careful design consideration.
3. It is recommended that the structural capacity of the building be analyzed by a design professional prior to installing a PV system on a Duro-Last roofing system.

Design and Installation Requirements

The following design requirements, which are supported by Duro-Last's published roofing specifications, should be considered when a PV system is to be installed on a Duro-Last roofing system.

1. A roof assessment should be coordinated through Duro-Last's Quality Assurance Department.
 - a) New Duro-Last roofing systems require inspection by Quality Assurance prior to installation of a PV system.
 - b) Existing Duro-Last roofing systems do not require an inspection; however, Duro-Last reserves the right to inspect the roof after a PV system installation.
 - c) In the event of an inspection, after the initial Duro-Last roofing system installation inspection, a \$500 inspection fee is required.
2. Adequate protection of the roofing membrane during the installation and serviceable lifespan of a PV system is the responsibility of the building owner.
 - a) Staging areas and paths of travel must be protected while installing the PV system. Laying ½" plywood or ½" OSB onto the installed membrane will prevent damage to the membrane and insulation below. It is the responsibility of the installing contractor of the PV system to protect the

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roofing membrane and substrate and to remove the protective boards once the PV installation has been completed.

- i. A structural engineer or roof design professional should calculate the load capacity of the roof while factoring the PV system components, snow, wind uplifts, and any additional loads.
 - ii. All load types should be transferred to the building without overloading the roof system.
 - b) High-traffic areas of the roof that are used for rooftop maintenance of PV arrays should be reinforced with Duro-Last Roof Trak[®] walkway pads.
 - i. It is the building owner's responsibility to remove the necessary PV components for any warranty repairs or roof investigation.
 - ii. Any factors such as firefighting access hatches or pathways, or potential electrical hazards, should be mitigated by the building owner, PV system integrator or PV system manufacturer.
 - c) Fire Resistance ratings, UL code approvals, insurance ratings, etc. should be considered by the building owner.
 - i. The PV system manufacturer should be consulted by the installing contractor of the PV system, to verify that their proposed PV system meets the expectations of fire code classification.
 - d) Drainage from the roof surface must not be impeded by the PV system.
3. Durable materials for long-term performance are required by Duro-Last to extend the life of the roof and match the expected warranty life of a building-mount or ballast tray PV system. As such, do not install a PV system on any Duro-Last roofing system that is less than 50-mil in thickness and/or has been installed for more than 5 years.
 - a) Adhered Systems (new Duro-Last roofing system) – Direct Building-Mount or Ballast Tray Systems
 - i. Duro-Last recommends an adhered Duro-Last Roofing system for PV installations.
 - ii. 60-mil Duro-Last, 60-mil Duro-Tuff[®], or 60-mil Duro-Fleece[®] membrane is required.
 - iii. Rigid cover board such as DensDeck[®], Securock[®], or DEXCell[™] is required.
 - b) Mechanically Fastened and Ballast Systems (existing Duro-Last roofing system) – Ballast Tray Systems
 - i. Care must be taken when installing PV systems on mechanically fastened or ballasted roofing systems to ensure that any billowing caused by high winds won't create contact with the PV system and damage the Duro-Last membrane. PV base mounts must not rest on any plate or fastener.
 - c) Slip Sheets (new or existing Duro-Last roofing systems) – Ballast Tray Systems
 - i. Sacrificial sheets are required on all ballast tray systems.
 - ii. Sacrificial sheets should extend at least 4 inches on all sides beyond the contact surface area of the rack base mount. The sacrificial sheet shall be a minimum 40-mil Duro-Last membrane.

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- iii. The sacrificial sheets must then be hot air welded along the entire perimeter of the rack base mount to reduce damage from movement of the PV arrays.

d) Solar Rack Anchoring Systems

Ballast Tray System

- i. Two solar rack anchoring systems are approved by Duro-Last for use with ballast tray PV systems on the Duro-Last roofing system. The number of anchors and the location of the anchors are to be determined by the PV system manufacturer or system integrator.
 - a. OMG® – OMG PowerGrip Plus®
 - b. Anchor Products – U-Anchor 2400™

Building-Mounted Systems

- i. If the PV racking system is mounted directly to the building structure, it is recommended that the mounting posts be made from round pipe. That way, they are more easily flashed with Duro-Last custom-fabricated pipe flashings. A certified Duro-Last contractor must install the flashings. The Duro-Last Quality Assurance Department should be contacted for inspections after the mounting post flashings are installed, but prior to the installation of the PV panels. This allows for easier access for inspections.

Warranty and Quality Assurance

PV systems can be installed on new or existing Duro-Last roofing systems. See the following requirements for Quality Assurance inspections regarding the Duro-Last warranty.

New Duro-Last Roofing System

1. Work related to the installation of a PV system, where welding of the Duro-Last roofing system is needed, must be performed by a certified Duro-Last contractor. Doing so fulfills the requirements of the Duro-Last roofing system warranty.
2. A Duro-Last authorized Quality Assurance representative must inspect the installation of the Duro-Last roofing system prior to the installation of the PV system panels, in order to assess the quality of the work and to issue an appropriate Duro-Last roofing system warranty.
 - a) Damage to the Duro-Last roofing system due to PV operation or maintenance is beyond the coverage of a new or existing Duro-Last roofing system warranty.
 - b) Duro-Last does not approve or guarantee the integrity, installation, or performance of any PV system or PV system component.
 - c) The welding of the slip sheets does not require inspection by the Quality Assurance Department, but must be performed by an approved Duro-Last contractor.

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Existing Duro-Last Roofing System

1. It is required that the Duro-Last Quality Assurance Department be contacted prior to installing any PV system on an existing Duro-Last roofing system. Doing so ensures that the Duro-Last warranty is updated.
2. It is not required that the existing Duro-Last roofing system be inspected by the Quality Assurance Department prior to the installation of the PV system, if the system is ballasted. If the system is building-mounted, then the Duro-Last Quality Assurance Department must be contacted after the mounting post flashings are installed (prior to installing the PV panel).