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## Residential Solar Panel Cleaning

What is the best way to clean your solar panels? What are the main concerns? Whether it's a large commercial array, a community solar garden or a residential installation, following basic guidelines can increase system output and reduce panel damage.

The standard operating procedures you should follow prior to cleaning solar panels include:

- 1) Inspect the entire solar system to detect loose or broken wires, damaged panels, or improperly functioning apparatus. Make necessary repairs or modifications for electrical safety prior to cleaning. Hire a licensed electrician if your system needs service.
- 2) Trim or remove vegetation to prevent interference with the system's operation.
- 3) Schedule panel cleaning early in the day or at night when it is cool. This minimizes thermal stress on photovoltaic cells and protective glass that could damage the panels. Cold water can microfracture hot panels. Also, a hot panel can evaporate water too quickly before it has dissolved and lifted contaminants.

Once the solar system is inspected according to system guidelines and any adjustments to meet code or specs are done, it is time to clean the panels. What should be used to clean panels?

A variety of equipment is available on the market for cleaning solar panels. For residential systems there are water-hose attachment systems that spray water onto panels through a long arm that can extend to reach higher mounted roof mounted panels. These pole extended systems have brushes mounted at the end of them to help scrub off residue prior to a final rinse. It is important that when cleaning panels that you use the softest brush available so that you don't scratch the panels.

For years the industry has recommended using water with this equipment to clean panels, but water alone is an ineffective cleaner. Are there additives that can enhance the cleaning performance of water?

Many solar panel manufacturers have previously claimed there is no need to clean panels, or if cleaning is necessary to just use water--more specifically, deionized water to reduce mineral deposits and spotting. However, solar panel systems that have been in operation for a few years often do not operate at their maximum output, causing obvious problems for the owners. Facilities located in dry climates or near agricultural fields, coastal areas, volcanos, airports, bird flight paths, or industrial areas have almost immediate output loss due to contaminant accumulation on the panels. Many arrays require more frequent cleaning simply due to their location, and many of the contaminants do not easily rinse off with water alone. What is the best option to effectively clean off bird droppings, jet fuel residue, plant matter, dust, sand, pollen and other contaminants?

Cleaning tough contaminants off panels with water additives is relatively easy ... but cleaning safely with a product that does not degrade panel films or the aluminum support rails is the real

challenge. Untested products might be effective cleaners, but can also shorten equipment life, resulting in negative economic consequences over time. Proven compatibility is paramount. Specialty solar panel cleaners are commercially available. Quality panel manufacturers test cleaning products for compatibility, and are an excellent source for recommendations.

Environmental concerns and personal safety must also be addressed. Cleaning effectiveness is a key parameter, too, as this optimizes power output, saves time and labor, and helps cut water usage—an important consideration in many locations. An approved, low-toxicity, biodegradable product that enhances the cleaning effectiveness of deionized or plain water should be the goal.

Detergent or any other product that is added to the water in a panel cleaning system should meet the following requirements:

- 1) It must be compatible with the solar panel films, aluminum rails, racking, and epoxy.
- 2) It should be approved by the solar panel manufacturer.
- 3) It must be biodegradable with low environmental impact and contain no VOCs.
- 4) It should have low toxicity for personal safety.
- 5) It should be specifically formulated to remove contaminants commonly found on panels.
- 6) It should rinse off thoroughly with no spotting or residue.
- 7) It should be dilutable in water and suitable for use with either tap or deionized water.
- 8) It should dissolve and remove dirt and dust off panels, offering hydroscopic action to achieve this performance enhancement.

These basis guidelines for cleaning and maintaining solar arrays help ensure that systems operate at their theoretical maximum output with the longest possible equipment life and ROI.

American Polywater Corporation is a specialty cleaning manufacturer that offers a product meeting these guidelines: Polywater<sup>®</sup> Solar Panel Wash<sup>™</sup>. For more information visit: <http://www.polywater.com/product/polywater-spw-solar-panel-cleaner/>