

DESCRIPTION

Polywater[®] Solar Panel Wash effectively cleans PV panels and maximizes power generation. Its special formulation removes a wide range of contaminants, such as air pollution residue, pollen, bird droppings, dust, and volcanic ash. It is designed with a rinsing aid to eliminate the need for deionized (DI) or reverse osmosis (RO) water. The Solar Panel Wash solution rinses clean without spotting.

Solar Panel Wash works without damaging specialty polymer coatings and without oxidation or abrasion to metallic rails and mounting brackets. Its use has been approved by solar panel and cleaning equipment manufacturers.

Solar Panel Wash is safe for users and the environment. It quickly biodegrades, so it will not affect surrounding plant life or water table/aquifers. SPW contains no solvents and is noncorrosive.

REDUCES WATER USE

Solar Panel Wash is more effective than water alone. As a result, soils are removed more efficiently and less water is used. Field experience proves this:

Solar Panel Wash was tested at a winery in India where the existing cleaning procedure used 5 liters of water alone per panel. Using a 25:1 water-to-SPW mix, only 3 liters were required to clean 10 panels. *Water use was reduced by a factor of 15.*

Solar Panel Wash has a spot-free rinse, eliminating the need for deionized water. Elimination of deionized water yields more water savings, since it takes more than a gallon of water to create one gallon of DI or RO water.

Efficient cleaning saves water and is more environmentally appropriate. It is an effective cleaning method that also saves labor time.

For more information, please see the [Solar Panel Wash Water-Saving White Paper](#).



Polywater's Solar Panel Wash is safe for users and the environment.

PRODUCT FEATURES

- **Increase Output:** Cleaner panels produce more power.
- **Economical:** Reduces water use and cleaning costs.
- **Safe on Equipment:** Compatible with panel hardware and anti-reflective films.
- **Environmentally Friendly:** Will not harm local water sources or plant life.
- **Quick Drying:** Sheeting action dries faster without spots.

APPROVALS

Polywater Solar Panel Wash is approved for use on most types of solar panels by the following manufacturers:

- Canadian Solar
- Solar World
- Sixvan Intelligent Systems Technology Co.
- Noark-Electric Co.

END USES

- Utility-owned solar farms
- Industrial arrays
- Commercial arrays
- Residential ground and rooftop-mounted panels

WASHING PANELS INCREASES PERFORMANCE

Regular cleaning maximizes PV system performance and longevity. A 2011 World Academy of Science, Engineering and Technology study concluded that “accumulated dust on the surface of photovoltaic solar panels can reduce the system’s efficiency by up to 50%.”¹

In an EPRI study, industry stakeholders estimate “panel washing can improve efficiencies by as much as 10-15%.”²

Cleaning maximizes return on investment. It is especially effective on flat, low-tilt panels. Google cleaned solar panels on their campus for the first time after 15 months of operation, and energy output doubled. A second cleaning, 8 months later, resulted in a 36% increase in output.³

Even small areas of contamination can have a significant impact on panel performance. Solar cells connected in series are only as good as the lowest performing cell. Cleaning is also good practice to avoid hot spots.

1 Sulaiman S, et al, “Effects of Dust on the Performance of PV Panels.” *World Academy of Science, Engineering and Technology. International Journal of Mechanical Aerospace, Industrial, Mechatronic and Manufacturing Engineering* Vol 5, No 10, 2011. Web 23 January 2017.

2 “Addressing Solar PV Operations & Maintenance Challenges: A Survey of Current Knowledge and Practices.” *EPRI*, Palo Alto, CA. 2010. 1008434.

3 Lam, Winnie. “Should you spring clean your solar panels?” *Google Official Blog*, 31 July 2009. Web 23 January 2017.

DIRECTIONS FOR USE

General Maintenance Note:

Inspect the entire solar array system prior to cleaning to detect loose or broken wires and panels or improperly functioning apparatus. Make necessary repairs before cleaning. Schedule regular cleaning and maintenance to keep system operating at theoretical maximum output.

Solar Panel Wash Usage Recommendation

Recommended, starting dilution ratio is 1 part Solar Panel Wash to 25 parts water (25:1). For heavily soiled areas, use a higher concentration. The cat # SPW-35HS hose adapter package has a selector switch atop the sprayer to toggle between the 25:1 and water-only ratios.

Always schedule panel cleaning early in the morning or at night when it is cool. This will minimize thermal stress on photovoltaic cells and protective glass that could damage the panels.

- 1) Use Solar Panel Wash solution to rinse panels. Rinsing removes loose sand and debris from the panels and protects them from scratching when brushes are used in Step 2. In locales known for hard water, deionized water can be used to dilute the SPW. It is okay to rinse with local water only. **Wet only the number of panels that can be brushed and rinsed before the SPW solution dries.** Large arrays may need to be cleaned section by section. Use heavier amounts of SPW on areas with bird droppings or other organic matter.
- 2) Scrub panels with a soft brush (hog’s hair or similar). Rinse the brush bristles frequently when cleaning heavily soiled arrays to reduce scratching. Use of brushes helps agitate the cleaning solution; dirt tends to “carry” or be lifted from the panels better. Water alone—even deionized water—will not adequately lift dirt. Solar Panel Wash is far more effective at removing residue and cleaning panels.
- 3) Allow solution to shed from the panel surface. Repeat steps 1 and 2 for hard-to-remove contamination.
- 4) Rinse the panels with Solar Panel Wash solution and let dry; otherwise, rinse with deionized water or local water supply.
- 5) If desired, dry the clean panels with a microfiber cloth for a fine finish.

Note: [Solar Panel Wash Instructional Video](#) demonstrates method.

ENVIRONMENTAL IMPACT

Solar Panel Wash is readily biodegradable per OECD Guidelines. Materials must be 60% biodegraded within 10 days to meet these OECD Guidelines. The resulting products of biodegradation are carbon dioxide and water. Because Solar Panel Wash is biodegradable, it does not accumulate in the environment. Solar Panel Wash is the environmentally safe solution to cleaning solar panels.

COMPATIBILITY

Solar Panel Wash is compatible with PV panels and is approved by multiple panel manufacturers. It is compatible with:

- Specialty films
- Aluminum rails
- Cables and wiring
- Mastics and sealants

Test Method

Panels were placed against a south-facing wall at a 45° angle at American Polywater's factory in Stillwater, MN.

A sprinkler sprayed the panels with ground water for 15 minutes at 3:00 a.m. each morning. Water conductivity was measured at 95 μ S, approximately 67 ppm water hardness. The panels were exposed to Solar Panel Wash using the following process over a two-week period:

- 1) Monday: Between 8:00 and 10:00 a.m. each panel was rinsed with a 25:1 solution of the Solar Panel Wash in water. The panel was then scrubbed with a very soft brush, then rinsed again with the 25:1 Solar Panel Wash solution and allowed to dry without any further water rinse.
- 2) Tuesday–Friday: Between 8:00 and 10:00 a.m. each day, both panels were rinsed with the 25:1 Solar Panel Wash solution and allowed to dry.
- 3) The panels were not cleaned over the weekends, but the sprinkler continued to spray the panels with groundwater for 15 minutes at 3:00 a.m. each morning.

CONCLUSION

Modules were reflashed after they were returned to SolarWorld. No degradation of the antireflective coatings or other irregularities to the panels were detected after application of the Solar Panel Wash.

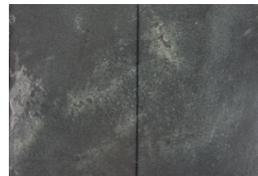
CLEANING EFFECTIVENESS

Solar Panel Wash removes a broad range of ash, dust, oils, and organic matter, rinsing the contamination clean from PV surfaces and aluminum rails.

Bentonite, oils, and salts were coated on glass panels to test cleaning efficacy. A 25:1 solution of the Solar Panel Wash in water was used to clean the surface. Cleaning solution effectiveness was compared to a water control.

Panels were coated and dried for 24 hours to set. Contaminated surface was lightly and evenly sprayed with either Solar Panel Wash cleaning solution or DI water control. Wetted surface was lightly passed with a soft cleaning brush, then rinsed with tap water. Results are noted below.

CONTAMINATION	SPW SOLUTION	CONTROL
Bentonite and mineral oil	Excellent (4)	Poor (1)
Salt solution and bentonite	Good (3)	Fair (2)
Bentonite and WD-40 [®]	Excellent (4)	Fair (2)



Before cleaning



Control. SPW

Solar Panel Wash diluted 25:1 emulsifies oils and lifts dusts. It simplifies and speeds the cleaning with less scrubbing and faster dry times.

MODEL SPECIFICATION

The statement below may be inserted into a customer specification to help maintain engineering standards and ensure work integrity.

The solar panel cleaning solution shall not contain solvents or other volatile components. It shall be non-toxic with a neutral pH for safe handling. It shall be biodegradable based on OECD standards.

The solar panel cleaning solution shall remove a wide range of contaminants including dust, ash, clay, pollen, industrial grime, and bird excrement. The cleaning solution shall rinse with a thin, water-shedding film to minimize spotting.

The solar panel cleaning solution shall be compatible with all panel components. It shall be approved and tested by solar panel manufacturers.

ORDER INFORMATION

CAT #	PACKAGE DESCRIPTION
SPW-35LF	1-qt. bottle (.95 liters)
SPW-35HS	1-qt. bottle with hose sprayer attachment (.95 liters)
SPW-128	1-gal. pail (3.8 liters)
SPW-640	5-gal. pail (18.9 liters)

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IMPORTANT NOTICE: The statements here are made in good faith based on tests and observations we believe to be reliable. However, the completeness and accuracy of the information is not guaranteed. Before using, the end-user should conduct whatever evaluations are necessary to determine that the product is suitable for the intended use.

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