Inside
Special

New product!
Proven safety with Rivolta P.H.C. Photovoltaic cleaner

Dear Readers

The expansion of regenerative energy is an important pillar of the energy transition. By 2050, renewable sources of energy such as hydroelectric and solar power, wind and geothermal are expected to replace a large proportion of fossil fuels. Also known as clean sources of energy, they are key to climate and environmental protection. Photovoltaic systems are also playing an increasingly important role as part of this safe and sustainable energy supply – from extensive solar parks covering a large area to the small panel on the roof of a private house.

Regular cleaning is absolutely essential for the long and efficient use of these systems. Our new photovoltaic cleaner Rivolta P.H.C. does this effectively and in an environmentally friendly manner. It has been extensively tested for its compatibility with the materials of PV modules.

You can find out more about our innovative cleaner in this newsletter.

Your team from Bremer & Leguil

Clean energy
Solar modules are still often referred to as self-cleaning systems. Practice shows that even a clean energy source needs regular cleaning. Depending on the location of the plant, a wide variety of contaminants are deposited on the modules. Dust, pollen, out-gassing, rubber abrasion and bird droppings are just a few of the disruptive factors. Cleaning with only water is often insufficient and the dirt solidifies. The deposits on the special glass drastically reduce the efficiency of the systems.

Rivolta P.H.C. special cleaner
The new Rivolta P.H.C. photovoltaic cleaner has been especially developed to clean the components of solar modules. The high-yield concentrate is characterised by its excellent cleaning effect and can accelerate the cleaning process. Re-soiling is reduced, power output and thus efficiency of the system are improved. At Bremer & Leguil we are proud to be able to offer our customers a solution that is as powerful as it is safe.

The first tested cleaner for photovoltaic systems
Safety has many facets at Bremer&Leguil: the safety for users and nature was the basic precondition for the development of Rivolta P.H.C. In addition, material compatibility always plays a major role in our products.

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Tested material compatibility
But our aspirations are much higher. The new cleaning agent should be safe for the entire service life of the of the photovoltaic system. As the sole supplier to date, we therefore had our product tested by the Fraunhofer CSP research institute for its material compatibility with PV modules.

The Rivolta P.H.C. photovoltaic cleaner is suitable for both industrial and private users. The cleaning solution can used on all systems – from solar parks to the roofs of private houses – using robots, brushes or sprayers.

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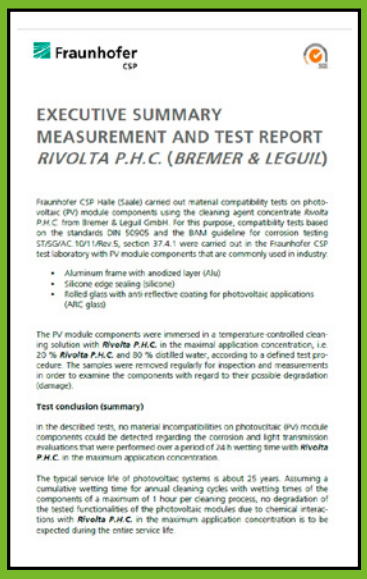
Material compatibility -
tested by the Fraunhofer CSP research institute

Rivolta P.H.C. is unique in the market. The photovoltaic cleaner is economical, highly efficient, non-hazardous, readily biodegradable with proven material compatibility. As the sole supplier to date and to analyse possible risks during wetting, we have had the P.H.C. cleaner from Bremer & Leguil extensively tested by the Fraunhofer CSP research institute for its material compatibility

In doing so, the following components were tested in PV modules commonly used in the industry:

- Aluminium frames with an anodic coating
- Silicone edge seal
- PV rolled plate glass with an anti-reflective coating

Based on the test results, no impairment of the tested functionalities of the modules due to chemical interactions as a result of contact with **Rivolta P.H.C.** can be expected during the entire service life of a PV system (approx. 25 years) – assuming an annual cleaning cycle and a maximum wetting time of the components of one hour per cleaning operation as well as use of the cleaner in the maximum application concentration.



Fraunhofer CSP

EXECUTIVE SUMMARY
MEASUREMENT AND TEST REPORT
RIVOLTA P.H.C. (BREMER & LEGUIL)

Fraunhofer CSP Halle (Saale) carried out material compatibility tests on photovoltaic (PV) module components using the cleaning agent concentrate *Rivolta P.H.C* from Bremer & Leguil GmbH. For the purpose, compatibility tests based on the standards DIN 50905 and the BAM guideline for corrosion testing ST/SG/AC.10/11/Rev.5, section 37.4.1 were carried out in the Fraunhofer CSP test laboratory with PV module components that are commonly used in industry:

- Aluminum frame with anodized layer (Alu)
- Silicone edge sealing (silicone)
- Rolled glass with anti-reflective coating for photovoltaic applications (ARC glass)

The PV module components were immersed in a temperature-controlled cleaning solution with ***Rivolta P.H.C.*** in the maximal application concentration, i.e. 20 % ***Rivolta P.H.C.*** and 80 % distilled water, according to a defined test procedure. The samples were removed regularly for inspection and measurements in order to examine the components with regard to their possible degradation (damage).

Test conclusion (summary)

In the described tests, no material incompatibilities on photovoltaic (PV) module components could be detected regarding the corrosion and light transmission evaluations that were performed over a period of 24 h wetting time with ***Rivolta P.H.C.*** in the maximum application concentration.

The typical service life of photovoltaic systems is about 25 years. Assuming a cumulative wetting time for annual cleaning cycles with wetting times of the components of a maximum of 1 hour per cleaning process, no degradation of the tested functionalities of the photovoltaic modules due to chemical interactions with ***Rivolta P.H.C.*** in the maximum application concentration is to be expected during the entire service life.

Benefits of **Rivolta P.H.C.**

Rivolta P.H.C. ...

... has been extensively **tested for material compatibility** by the Fraunhofer CSP institute.

...is **biodegradable**.

...has **excellent cleaning properties**.

...**reduces further soiling**.

...**improves the power output** of the PV modules.

...**does not require** precautionary **hazard labelling** according to the CLP regulations.

...is suitable for both **manual cleaning** and large-scale cleaning using **cleaning robots** – **without** the need for reverse **osmosis purified water**.

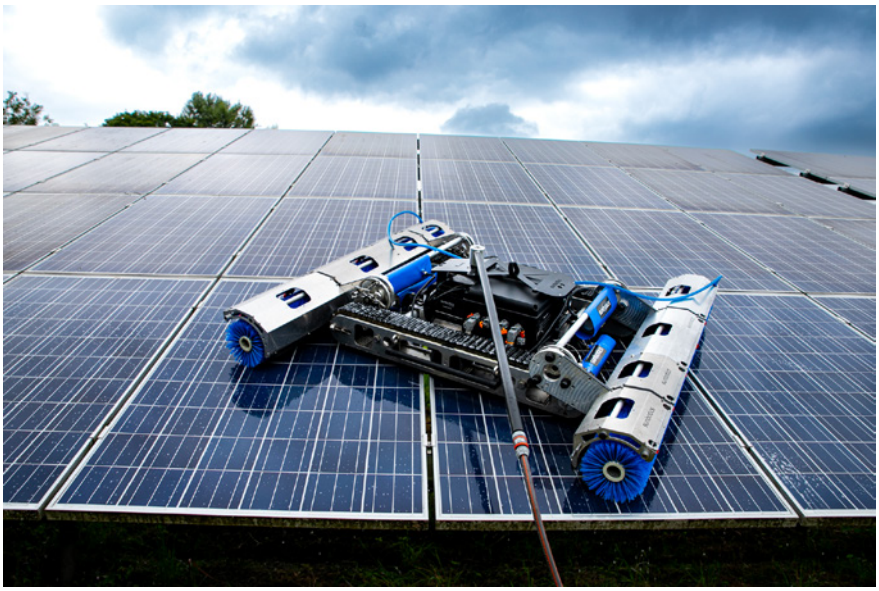
Convincing in practice

Tested special cleaner

We have already subjected our new **Rivolta P.H.C.** special cleaner to thorough laboratory testing. With the positive test results already in the bag, nothing stood in the way of the long-awaited practical test. This was to be carried out by our long-term partner, ONESOLAR.

From the initial concept to the practical test

Here, people were already eagerly awaiting the practical test, after all, the idea of a photovoltaic cleaner was born from the house of Bremer & Leguil together with ONESOLAR. The idea of cleaning PV modules was already being considered during a demonstration of the cleaning of transformers.



sunbotics cleaning robot
Image rights: ONESOLAR

l.t.r.: Pascal Liebold, Matthias Wintersohl, Oliver B. Wünsch and Christoph Haas
Image rights: ONESOLAR

Up to that point, the team from ONESOLAR had been banking on water purified by reverse osmosis. For the company, this was the best alternative so far from a sustainability point of view. However, the team were never fully enthusiastic about the effectiveness of the cleaning. Remaining residues allowed the rapid re-adhesion of dirt. The idea was born for a biodegradable special cleaning agent with impressive cleaning performance.

Experienced specialists

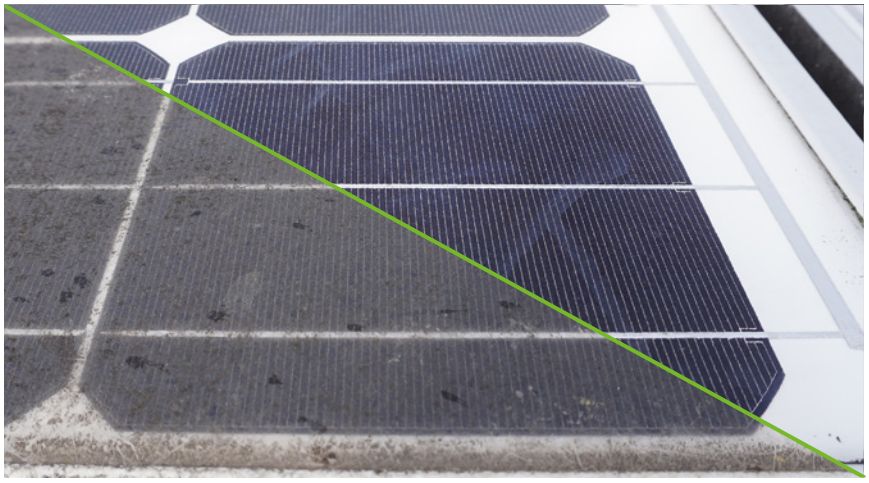
No wonder then, that once again we were able to rely on the judgement and experience of ONESOLAR for the practical test. For our colleagues Matthias Wintersohl und Oliver Wünsch it was then a case of promptly setting off for the head office in Eching. Here the pair met Christoph Haas, the Departmental Manager for Service, Maintenance and Operations at ONESOLAR International GmbH. In addition, they fetched Pascal Liebold, Managing Director of sun-x GmbH, who provided his own specially developed Sunbotics robots for the test.

The results

The test revealed the full capability of our **Rivolta P.H.C.** special cleaning agent. – the whole team was thrilled.
In the first practical test, reverse osmosis purified water was used for cleaning. The coarsest dirt was removed, but a sticky film remained, which allows new dirt easily to adhere. Then in the next test, our cleaner was used.

The team is impressed

„**Rivolta P.H.C.** shows an impressive cleaning effect! Our test yielded a significantly better result when compared with cleaning PV modules with water purified by reverse osmosis. The modules were free from all residues and showed a smooth surface, which delays re-soiling and increases profitability," according to Christoph Haas.



before/after-effect

Read more on next page ▶▶

Convincing in practice

Rivolta P.H.C. is suitable for manual cleaning and abseil cleaning with brushes...

High performance and economy

In further tests, the concentration was reduced to test the efficiency of the cleaner. Even when diluted to 1:100 and with extreme soiling, the team achieved a convincing result with **Rivolta P.H.C.** It shows that the cleaner is not only powerful but also economical.

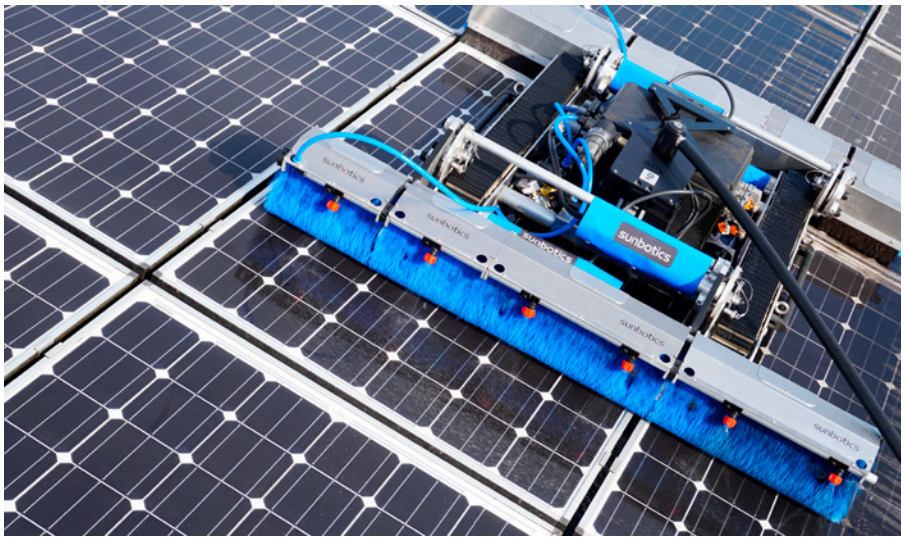
"At first we were sceptical, as far as the cleaner was concerned. But after we were able to test it for several days in really tough circumstances, a large array on a barn for dairy cows, I am now convinced by **Rivolta P.H.C.** and we will now be using it permanently. The cleaning performance is really tremendous and ideal for use with our robots. For this test, we dispensed with reverse osmosis water and used well water. The fact that it is tested by Fraunhofer CSP also gives us and our customers security in the use of it," says Pascal Liebold.

Biodegradable

At Bremer & Leguil, safety has always been an issue that goes far beyond material compatibility. With our special formulations, our product portfolio always provides our customers with a high level of safety for the user as well as for nature and the environment. Our latest product is therefore also biodegradable.

An important point that Christoph Haas also endorses: "Because at ONESOLAR we attach great importance to nature conservation and **Rivolta P.H.C.** is easily biodegradable, it is perfectly suited for cleaning our ground-mounted solar panels. We are delighted that Bremer & Leguil have succeeded in developing such an effective and environmentally sustainable cleaning product for photovoltaic modules."

Rivolta P.H.C. is supplied as a concentrate and must be diluted with water before use.



...as well as for cleaning large areas using robots.

Meet us at

inter solar connecting solar business | EUROPE

14th until 16th of June 2023,
Exhibition Center Munich.
Hall A2, booth 410

With thanks to: sun-X sunbotics ONESOLAR

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