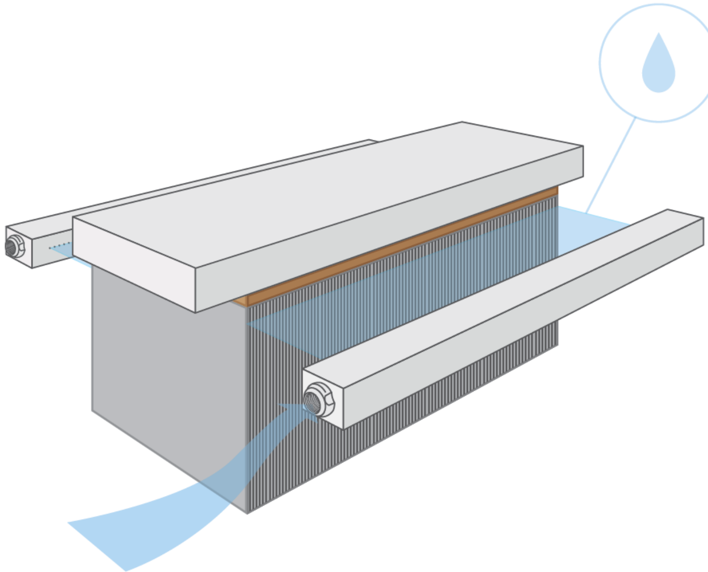
ICB

Chemical Solutions for Photovoltaic Manufacturing

Solar Wafer Cleaning Agents

Pre-cleaning



The wafer pre-cleaning focusses on the removal of slurry and other contaminations originating from the process of multi-wire or diamond wire sawing. This is done straight after sawing while the wafers are still glued to the mounting block.

We have developed a range of cleaning agents for various customers whose pre-cleaning processes differ from each other. The following list contains an excerpt of our most successful state-of-the-art pre-cleaning agents.

Puratron®-85S is a highly efficient cleaning agent which is applied in the pre-cleaning of mono- and polycrystalline silicon wafers that have been intensely contaminated with slurry and silicon saw dust in the multi-wire sawing process. Even in diluted form Puratron®-85S has a high dispersing and soil absorption capacity. This enables it to remove and absorb impressive amounts of slurry and other particles from wafer surfaces. Furthermore, there will be no more typical wafer defects like the appearance of spots or stains on the wafer surface when using Puratron®-85S. In years of application its functionality has been proven even under the most adverse process conditions, in particular with respect to cleaning performance. Designed as a low-foam cleaning agent, Puratron®-85S is especially suitable for spray cleaning.

Pre-cleaning

Puratron®-88: Developed as a completely foam-free alternative to Puratron®-85S with equal cleaning performance, Puratron®-88 is applied in pre-cleaning processes in which an absolute foam-free environment is desired. Depending on the cleaning equipment and the applied process parameters even small amounts of foam can interfere with the cleaning process.

Puratron®-39 is a highly efficient cleaning agent for the removal of saw slurry and silicon saw dust from mono- and polycrystalline silicon wafers after multi-wire sawing and additionally serves as a lubricant in the subsequent process of wafer singulation. The benefit of Puratron®-39 is its dual-purpose applicability in consecutive wafer processing steps. While its cleaning performance matches that of our other pre-cleaning products, Puratron®-39 stands out for its excellent lubricity derived from a composition of synergetic surface-active substances. Through the lubricity effect scratches on the wafer surface can be avoided and breakage rates are dramatically reduced, thus increasing wafer yield. Formulated as a low-foam cleaning agent, Puratron®-39 is especially suitable for spray cleaning processes.

Furthermore, when handling wafers in-between different process steps, Puratron®-39 inhibits drying of the silicon surface, which is crucial for preventing the formation of spots and stains on the wafer. This way Puratron®-39 increases the operating window of wafer handling processes.

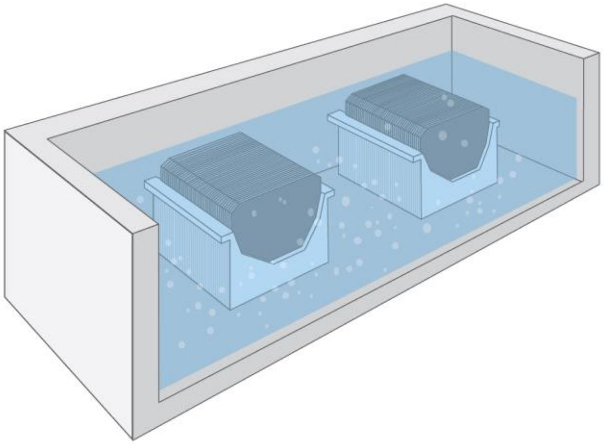
Puratron®-77 has been developed for effectively **removing iron-, copper- and other metal contaminants** from the wafer surface in pre-cleaning, final cleaning as well as after de-glueing of mono- and polycrystalline silicon wafers. In pre-cleaning and final cleaning it serves as an additional additive to other cleaning baths. For thorough reduction of metal contaminants, Puratron®-77 can also be applied after de-glueing.

Final Cleaning

After singulation the wafers undergo a final cleaning procedure which may consist of various process sequences including alkaline cleaning, DI-rinses and optional acidic cleaning. The final cleaning is either done in horizontal in-line or vertical carrier-based cleaning equipment. We offer cleaning agents for both processes. The following list contains an excerpt of our most successful state-of-the-art products for final wafer cleaning.

Puratron®-11

Formulated for vertical carrier-based cleaning equipment

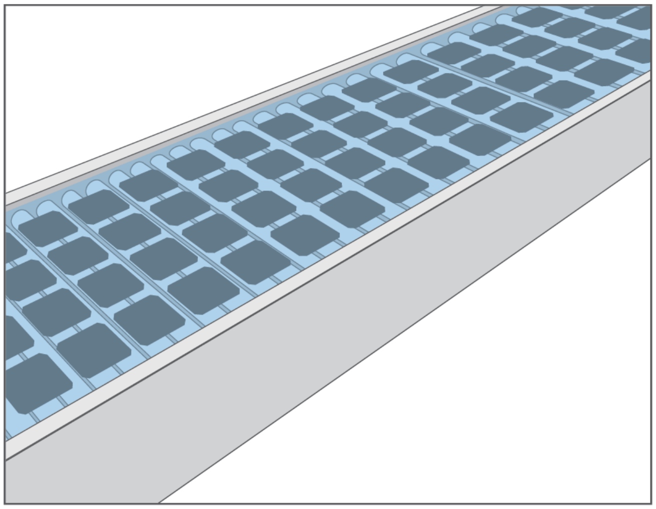


Puratron®-11 is a mildly alkaline, ultra-high purity cleaning agent designed for effectively **removing organic and particle contaminations** in the final cleaning of mono- and polycrystalline silicon wafers. Developed for the application in **vertical carrier-based cleaning equipment**, Puratron®-11 unfolds its full potential in ultrasonic-assisted cleaning processes. Owing to its excellent wetting activity, Puratron®-11 is highly successful in removing particle contaminations from the wafer surface. Moreover, its strong anti-redeposition power keeps the particles from reattaching. Puratron®-11 contains significantly low metal impurities, meeting most stringent purity requirements essential for processing silicon wafers for the manufacturing of photovoltaic cells.

Final Cleaning

Puratron®-62

Formulated for horizontal in-line cleaning equipment



Puratron®-62 is a mildly alkaline, ultra-high purity cleaning agent designed for effectively **removing organic and particle contaminations** from mono- and polycrystalline silicon wafers in the final cleaning with **horizontal in-line equipment**. Developed as a low-foam cleaning agent, Puratron®-62 is also suitable for **spray cleaning**. It unfolds its full potential in cleaning processes with ultrasonic assistance. Owing to its excellent wetting capability, Puratron®-62 is thoroughly removing particle contaminations from the wafer surface. Moreover, its strong anti-redeposition power prevents particles from reattaching. Puratron®-62 contains significantly low metal impurities, meeting most stringent purity requirements essential for processing silicon wafers for the manufacturing of photovoltaic cells.

Final Cleaning

Puratron®-62MC

Formulated for horizontal in-line cleaning equipment

Puratron®-62MC embodies all of the advantages and properties of Puratron®-62, but in addition to removing organic and particle contaminations it **also removes iron, copper and other metal contaminants** from the wafer surface. It is designed for the final cleaning of mono- and polycrystalline silicon wafers with **horizontal in-line equipment**. Developed as a low-foam cleaning agent, Puratron®-62MC is also suitable for **spray cleaning**.

Puratron®-45M

Formulated for horizontal in-line and vertical carrier-based cleaning equipment

Puratron®-45M is an acidic, ultra-high purity cleaning agent, developed for effectively **removing iron-, copper- and other metal contaminants** from the wafer surface in the fine cleaning of mono- and polycrystalline silicon wafers. Formulated as a low-foaming cleaning agent, Puratron®-45M is suitable for the application in both **carrier-based and in-line cleaning equipment**. Even in **spray cleaning**, Puratron®-45M does not develop any troubling foam. It unfolds its full potential in ultrasonic-assisted cleaning processes. Puratron®-45M contains significantly low metal impurities, meeting most stringent purity requirements essential for processing silicon wafers for the manufacturing of photovoltaic cells.

Overview Wafer Cleaners

Pre-Cleaning

Puratron®-85S

- Thorough removal of slurry
- High soil absorption capacity
- No more spots or stains
- Low foam adjusted
- Suitable for spray cleaning

Puratron®-39

- Thorough removal of slurry
- High soil absorption capacity
- Suitable for spray cleaning
- Increased yield after wafer singulation
- Inhibits drying of wafer surfaces

Puratron®-88

- Absolutely foam free alternative to Puratron®-85S
- Designed for cleaning processes where even small amounts of foam are undesired

Puratron®-77

- Removal of iron, copper and other metal contaminants
- Application recommended for pre-cleaning and after de-glueing

Final Cleaning

Puratron®-11

- Mildly alkaline and ultra-high purity
- Removal of organic and other particle contaminations
- Formulated for carrier-based cleaning

Puratron®-45M

- Acidic and ultra-high purity
- Removal of iron-, copper- and other metal contaminants
- Low foam behavior
- Suitable for carrier-based and in-line cleaning equipment

Puratron®-62

- Mildly alkaline and ultra-high purity
- Removal of organic and other particle contaminations
- Designed for in-line cleaning

Puratron®-62MC

- Mildly alkaline and ultra-high purity
- Removal of organic and other particle contaminations
- Additionally, removal of iron, copper and other metal contaminants
- Designed for in-line cleaning

ICB – Innovative and Sustainable Chemical Engineering

About us

ICB was founded in 1990. In the successful years that followed, ICB consistently expanded its business operations and established itself as a reputable medium-sized company. Its business is focused on formulating process chemicals for the semiconductor and photovoltaic industry. Further business segments include electroplating for printed circuit boards, general metal finishing and technical cleaners for various industries.

Since more than two decades major high-technology solar wafer manufacturers successfully use **Puratron®** for their wafer cleaning processes. Tailored for the photovoltaic industry, the **Puratron®**-series has proven itself in many years of practical application by our customers to be exceptional.

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