

# Smaller Supplier, Bigger Tasks

Technical cleanliness in the process and the highly ambitious cleanliness specifications, especially in the high purity segment, are increasingly becoming a difficult task even for smaller producers of precision parts and assemblies. As the existing machine equipment is often no longer adequate, new cleaning technology is required.

Gerhard Koblenzer

Kusters Precision Parts B.V., based in the Dutch industrial city of Oss, also had to deal with the question of which machine technology to invest in. The company operates internationally in the market for suppliers of high-precision machined components for high-tech OEMs. The components are made from various types of metal and plastic and are used in the

semiconductor, aerospace, optical and pharmaceutical industries, among others.

## Cleaning system with connection to a clean room required

The existing pre-cleaning system was to be supplemented by a system with a direct connection to the cleanroom, which would achieve the ASMLGrade2 and higher cleanliness requirement in combination with a subsequent bake-out process. In addition, a compact system was required that could be transported through a “bottleneck” in the building to the installation site on a higher level.

## Clarify the change mode

The Kusters example is a practical reflection of the momentum that medium-sized and smaller suppliers are currently experiencing. It is clear that they have to grow with their tasks and change something. But how exactly and to what extent – also in terms of investment – is often unclear at the beginning. This is because the entry into the new field of activity often begins with small quantities or small series with medium requirements – or with a small quantity and significantly higher demands.

The German company LPW Reinigungssysteme GmbH supports international customers in this reorientation. Experience has shown that the following questions help in the decision-making process:

- Is my existing cleaning technology able to cover the demand in terms of capacity and meet the new requirements?
- If no: Is my existing cleaning system suitable for pre-cleaning?
- Can my existing processes be designed in such a way that they have no negative impact on the required cleanliness in production and on cleaning itself?
- Is it possible to maintain cleanliness after a cleaning process in such a way that components/assemblies reach the defined place of actual use in a traceable and safe manner?

If the pre-cleaning is ensured by the existing system technology (in terms of capacity and quality), the investment in new cleaning technology can be made in stages, starting with high-quality final cleaning.

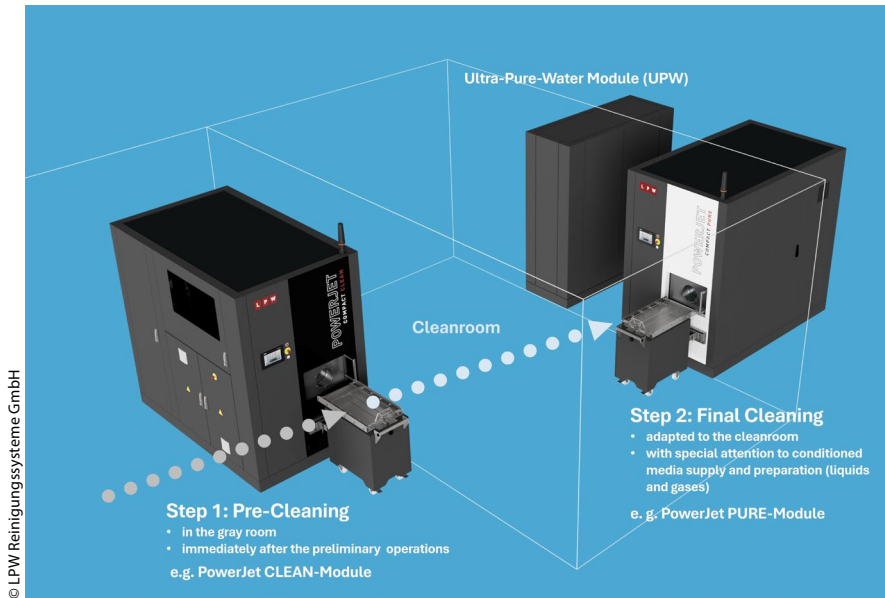
## Modular and scalable system concept

On this basis, the system manufacturer has developed the compact and modular Power Jet Compact standard system concept. It is divided into two modules with individual process capability. Module 1 allows high-quality pre- and intermediate cleaning of lightly loaded components (2-tank system with optional extension to a 3-tank solution) for use in the gray room. Module 2 consists of a super-fine/ultra-fine cleaning unit for direct connection to the cleanroom (2-tank solution) – with optional addition of a UPW, which



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The installation of the new system was a challenge and had to be well planned due to the special location.



A solution for the step-by-step addition of cleaning technology.



The system for super-fine and ultra-fine cleaning can be adapted to cleanroom-supported ambient conditions.

ensures the supply of ultrapure water (sterilized, TOC in the 2-digit range, conductance values  $< 0.1 \mu\text{s}$ ) and can also be used as a final rinsing loop before drying. The concept is rounded off by a clean AM module, which was specially designed for removing residual powder from complex geometric structures after the additive manufacturing process. Thanks to an additional tank module, it is also suitable for final cleaning after a post-processing step. With the appropriate upstream connection including suitable pre-processes, this technology can be used to achieve the highest requirements in terms of particulate or film, such as those required in high-vacuum technology. The system manufacturer also provides support with services such as process optimization and integration, parameter definition for cleaning programs and employee training, as well as cleanroom-based contract cleaning of small quantities during the start-up phase.

### Customized system design

A meeting at the trade fair “Clean” was quickly followed by the first trials at LPW, all of which met the cleanliness requirements of both Kusters and its customer Thermo Fisher. In the end, the Dutch company opted for a system setup that has been in operation since April. The specifications of the Power Jet Compact CNp system in the “Pure” version with 2-tank system for flood cleaning and

spraying processes and a batch size of  $600 \times 400 \times 300 \text{ mm}$  include:

- Manual loading using a trolley supplied
- Filtration in full flow
- Automatically controlled CNp for long and short cycle processes, cleaning and rinsing
- Ultrasonic 40kHz
- Hot air drying with H13 pre-filter and hot air infrared drying
- UPW module with 500l pre-tempered ultrapure water (max.  $65^\circ\text{C}$ )
- Circulation treatment including UV sterilization
- Integrated conductivity and TOC value measurement as a ready-to-connect stand-alone unit
- Control connection to the cleaning system

The sensor system has conductivity measurement in the sink and in the working chamber. The pH value is measured in the cleaning tank, the particle sensor is located in the rinsing tank. Chemical dosing is automatic and remote maintenance is carried out via a VPN connection.

### Lean approach enables sustainable growth

If a company has already been involved in the ultra-clean supply chains for some time or if it is expected that the quantities will increase rapidly, it may be necessary and sensible to adapt the processes in one piece. For “newcomers” in the respective

supply chains, the new processes should be introduced step by step for organizational and economic reasons. This is because these companies in particular are often confronted with requirements at the beginning that require a qualified pre-cleaning status in addition to the precision and quality of the respective component. Once these processes have been established, the new tasks relating to technical cleanliness follow with higher demands and often also larger delivery quantities. This approach enables sustainable growth with the new tasks. //

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