Spotless cleaning every second

With traditional cleaning, stain removal is only possible with a lot of effort: several cleaning and rinsing stages, complex chemistry, high energy consumption and space requirements, close maintenance and bath care.

The challenge for the cleaning processes is enormous: developing an efficient and reliable cleaning solution for different workpieces with different dirt, which varies in type (particles, abrasion, emulsion, oils) and quantity and ultimately produces stain-free surfaces (at room temperature).

Traditional chemical cleaning systems are multi-stage, time-consuming and cause many problems. These include the high space requirement, energy consumption, drying by evaporation and the complex maintenance of the cleaning baths (e.g. continuous monitoring of the cleaning agent concentration, change of the rinsing media, which leads to unplanned downtime). The complexity of the systems affects the availability of the entire production line.

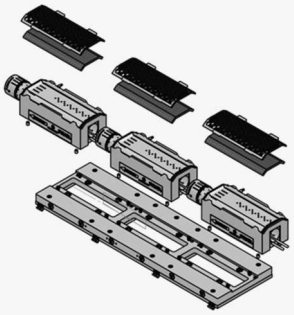
Fluid mechanics and vibration instead of chemicals and heat

Conventional industrial cleaning is usually based on the use of chemicals and heat to remove contamination from workpieces. This approach has some disadvantages, such as the consumption of resources, the potential environmental impact of chemical substances and the difficulty of achieving consistent results. In particular, freedom from stains can only be achieved with a great deal of effort with such processes, as dried chemical residues directly lead to stains.

In contrast, the innovative mechanical process offers technological advances that rely on fluid mechanics instead of chemistry and heat. By using 3D printed nozzles that perfectly fit the workpiece surface, chemical cleaning is replaced by mechanical cleaning performance. This process has a very high effectiveness density, which means that very effective cleaning can be achieved.

The flow mechanics adapted to the workpiece offer a number of advantages. Firstly, they enable precise alignment of the cleaning flow to reach all surfaces of the workpiece. This means that even hard-to-reach areas can be thoroughly and powerfully rinsed. In addition, the use of coordinated fluid mechanics leads to an efficient use of resources as no chemicals or large amounts of heat are required.

Another advantage of the innovative process is its high reproducibility and low process fluctuations. The precise control of the flow and the use of 3D-printed nozzles enable repeatable cleaning results to be achieved. This is particularly important in industrial applications where consistent quality and efficiency are required.



Geometrically adapted 3D printed nozzles as equipment that can be set up without tools

In addition, the cleaning effect is enhanced by the use of vibration. On the one hand, the vibration improves the flow around the surfaces and enables dirt to be removed more effectively. On the other hand, it puts the workpiece in a quasi-floating state, which ensures uniform cleaning and drying of all surfaces.

In summary, the innovative process for industrial cleaning offers significant advantages over conventional chemical cleaning. The use of fluid mechanics, 3D-printed nozzles and vibration enables efficient, environmentally friendly and reproducible cleaning. The process saves resources, reduces the use of chemicals and employee retention and delivers consistent results with minimal process fluctuations.

Findings

Geometries:	ø3 – 32mm, Length 7 – 330mm Blind holes up to ø10mm, depth 50mm
Output rate:	2 seconds per workpiece cycled 5.7 meters per minute continuously
Pollution:	Emulsion 3 – 7%, oil
Follow-up processes:	Visual inspection, packing, assembly
Reference customers:	Several in the EC, information on request

Technology comparison

	Conventional chemical cleaning	**OSSBERGER Coli-Cleaner L**
Cleaning process	1. Aqueous, chemical cleaning 2. Intermediate rinse(s) with demineralized water 3. Clear rinse with demineralized water (designed as flow rinse) 4. Warm evaporation drying	1. Vibration cleaning dry 2. Flow/vibration rinsing 3. Cold drying
Resource consumption/waste of resources	35 - 60 kW power consumption Oil / cleaner disposal 3 kg cleaner per 1 kg oil 40-250 liters / h demineralized water 8 - 22 m2 footprint	9 kW power consumption Contamination-free recycling of oil 7 liters / h demineralized water 2 m^2 footprint
Bath care & maintenance	Maintenance of oil separator Maintenance of detergent concentration in the bath Check rinsing water for carryover and renew it regularly	Dry pre-cleaning instead of oil separator Automatic pumping back of recycled oil and tank level control
Cost savings	0 %	**- 40 % investment costs** **- 70 % space requirements** **- 80 % energy consumption** **- 90 % media consumption** **- 75 % maintenance costs** **+ 95 % oil recycling**

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▸ VIDEO

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