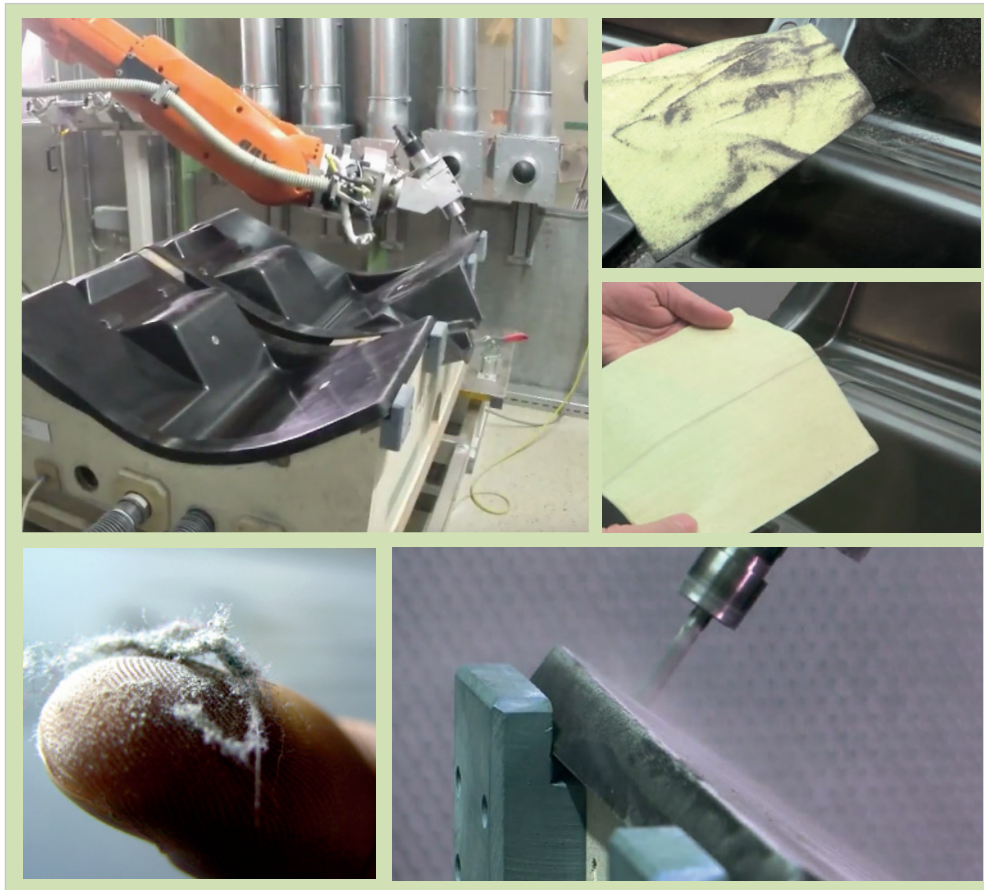


# [ars] Air Return System



Perfect extraction system  
with process air return  
for 5-axis machining centers



## at home in Germany - active in Europe

Dear Schuko customers, stakeholders and partners,

Schuko is one of the leading European experts in the field of extraction and filtration technology. Everything is in our hands, as consulting, planning, production, delivery, installation, commissioning, maintenance and operator training. For nearly 50 years, Schuko has represented the customer's consistent proximity as a family business. Our employees at the 7 locations of Schuko Group meet this requirement day after day with their know-how, experience and comprehensive service. Schuko represents innovative solutions „Made in Germany“, which contribute to the health protection of its employees, cleaning in the workplace and even to the highest quality of the product. The high level of satisfaction of our customers in various branches of commerce and industry confirms that we are on the right track to continue growing in the future - in our core market in Europe and beyond.

As a member of the German Engineering Federation (VDMA), Schuko adds great importance to the plant safety according to the state-of-the-art and established rules. Many products have been tested by the relevant professional associations (as Holz-BG). They have the safety certifications and „dust-tested“ seal of approval.

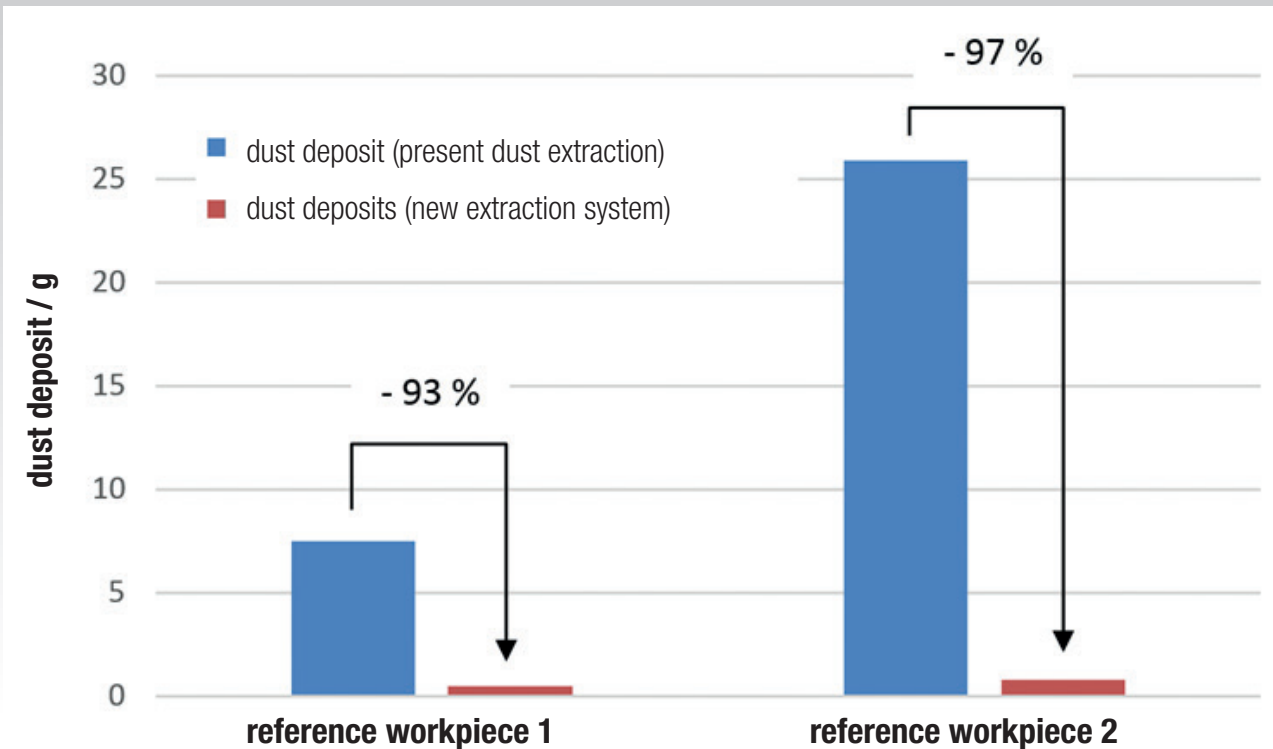


Of course, our technical consultants will answer your questions about extraction and we will gladly set an appointment with you to discuss your individual needs.

Convince yourself!

Yours sincerely, Andre und Heiko Schulte-Südhoff

## Success of the new [ars] extraction system with process air return



## Research project and cooperation



In cooperation with Fraunhofer Institute for Production Engineering and Automation IPA, funded by the Federal Ministry for Economic Affairs and Energy, Schuko has developed a new, reducing fine dust and energy consumption extraction system.

The results are groundbreaking with approximately 93 - 97% less dust deposits on the workpieces and up to 40% energy savings in the extraction.



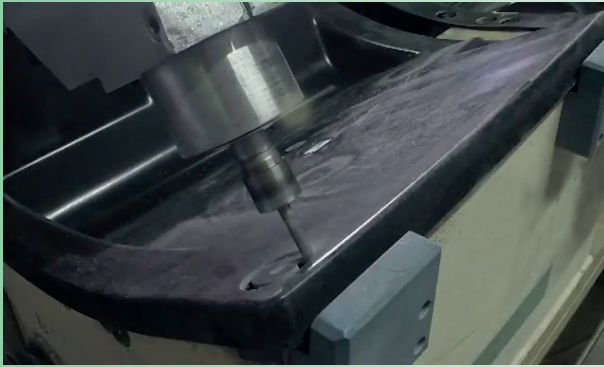
Gefördert durch:



aufgrund eines Beschlusses des Deutschen Bundestages





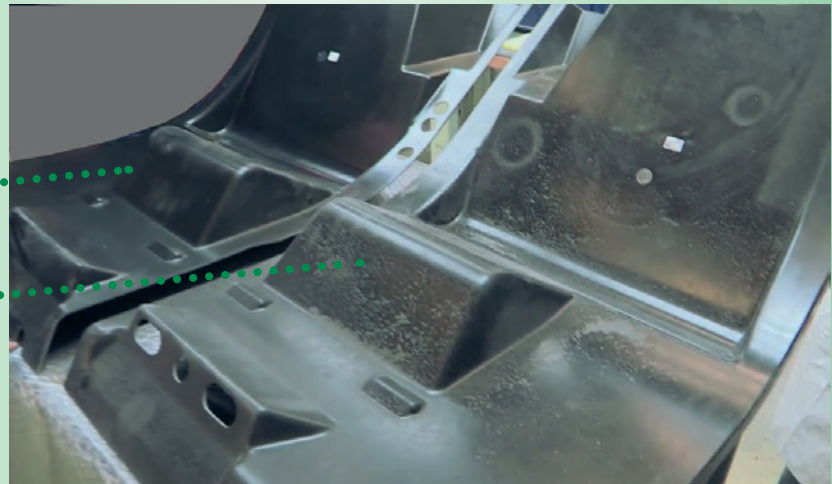


- In the machining operations (milling, drilling, etc.) of wood and fiber-reinforced plastics / carbon, large amounts of fine dusts and chips arise, which can potentially represent a danger to humans and the processing machine.

### Comparison

Workpieces produced with [ars] system

Conventional pollution degree after production process



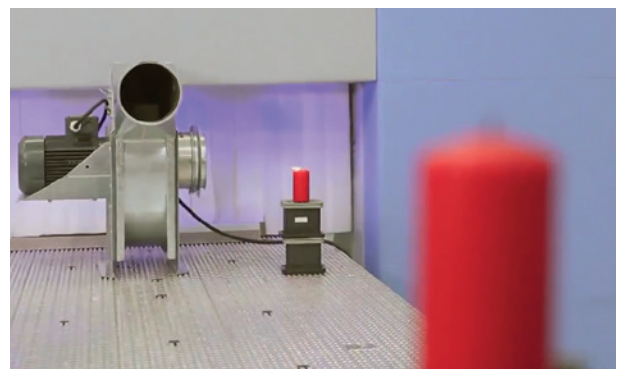
## New extraction system [ars] - Air Return System

### Task

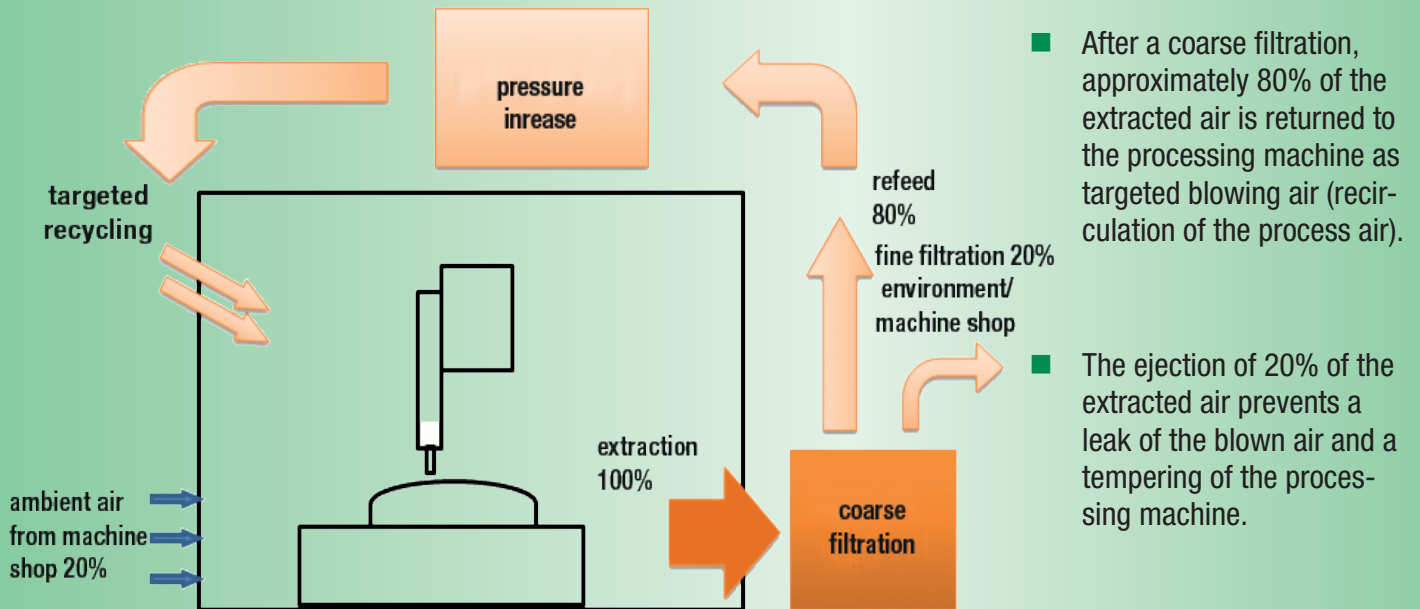
- The detection of particles in complex components is usually poor, resulting in high dust emissions. The required higher manual cleaning effort leads to a slowdown in production.
- Dust must be extracted efficiently because it represents a threat to the employees and the processing machines.
- Reduce the energy consumption of the extraction systems.
- Reduce fine dust emissions in the filtered air.

### Dust and chips are blown and sucked to the suction device

- The new suction system [ars] uses a combination of suction and blow off instead of pure suction.
- The blown air has a range about 30 times larger than suction air and can be used in a much more targeted way to transport the particles to the extraction hood. Increase suction power is often non-value-added.



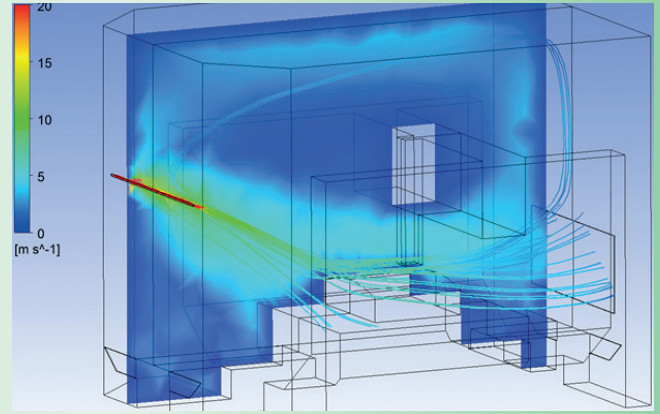
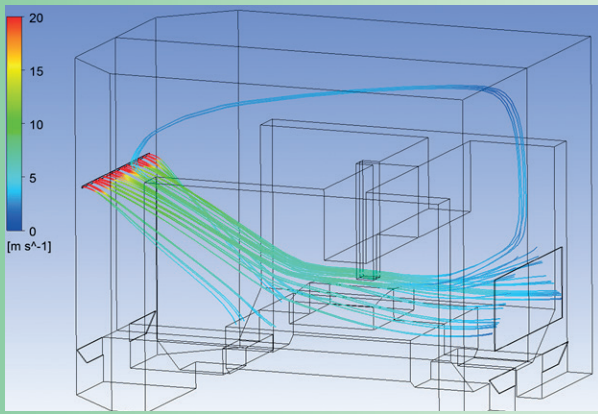
# System principle [ars] Air Return System



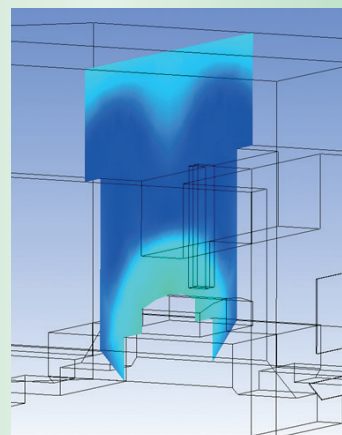
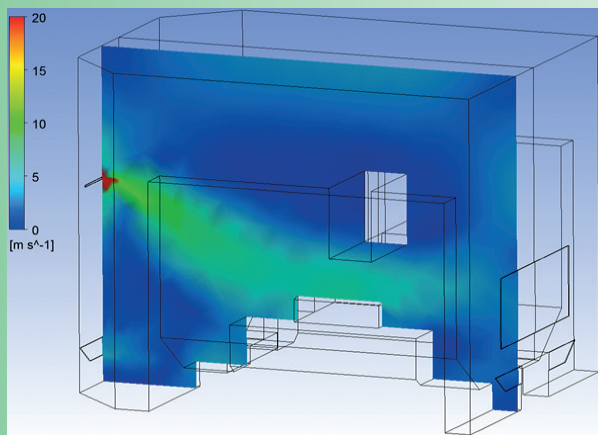
- After a coarse filtration, approximately 80% of the extracted air is returned to the processing machine as targeted blowing air (recirculation of the process air).
- The ejection of 20% of the extracted air prevents a leak of the blown air and a tempering of the processing machine.

## Advantages

- Significant increase in fine dust and chip detection
  - ✓ Less manual cleaning
  - ✓ Higher productivity
  - ✓ Increasing process reliability
  - ✓ Better work and environmental protection through lower dust emissions
- Reduction of the necessary suction power and filter resistance
  - ✓ **Energy savings: up to 40%**
- Circulation of 80% of the extracted air
  - ✓ **Reduction of heat loss: 80%**
  - ✓ **Reduction of fine dust emission: 80%** (even finely filtered air still contains fine dust particles)
- Due to the increased particle detection, the suction power can be reduced in size compared to a conventional system.



**Detection of blown air loaded particles > 90%**



**High air speed on the component**

## Results Simulation for large systems

### The decisive advantage is a targeted air flow

- The air is blown into the cabin in a targeted way, guided over the workpiece to capture the particles, and consistently sucked and filtered at the other end of the cabin.
- This air returns to the cabin and only a small percentage is ejected, so the fresh air can flow.
- The advantage is: the air circulates and is fed back to the process permanently, in other words, only little fresh air is contaminated.
- Saving of energy and heating costs through efficient utilization of the fan, since the same air is used for sucking and blowing.
- Fewer filter stages provide less resistance in the system, increasing the saving of energy.
- Wide variety - because no individual solution is required for each component.
- The system is transferable to different production processes and applicable everywhere.
- The new solution is universally applicable for all different components and a perfect solution that always works and needs to be installed only once.



# First pilot plant at Polytec company

(supported by ReTech-BW funding)



- 1 Component on clamping device
- 3 Milling robot

- 2 Exhaustion hood
- 4 Height-adjustable nozzles

Fraunhofer IPA; Fotograf: Rainer Bez



Schuko filter system especially for carbon dust extraction; Photographer: Rainer Bez

## Results of the pilot plant

- Reduction of fine dust emissions: 80%
- Reduction of energy consumption: 40%
- Increase of productivity through reduced cleaning effort
- Reduction of rejects
- Significant time saving
- Improved health and safety at work and higher employee acceptance

funded and supported by



Baden-Württemberg

MINISTERIUM FÜR UMWELT, KLIMA UND ENERGIEWIRTSCHAFT

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**We stand for new ideas!**

**Schuko**

Dust extraction and filter technology

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