

Explore the case study between Prusa Research and Alveo3D, highlighting our collaboration to provide effective filtration solutions

ADVANCED FILTRATION SYSTEM



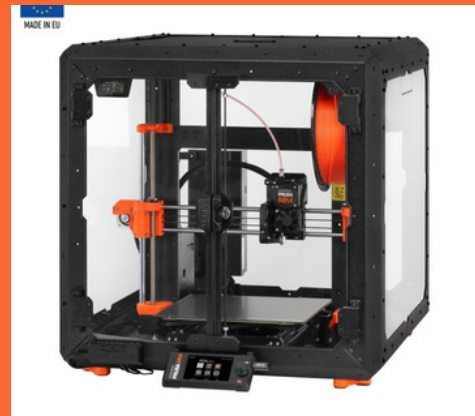
- PRUSAMENT FILAMENT TESTING
- AIR FLOW OPTIMIZATION
- TEST TEMPERATURE
- ADVANCED FILTRATION SYSTEM
- CUSTOMIZATION OF FILTERS & FANS

PROJECT TIMELINE

✧ TRUST – PROFESSIONAL – PATIENCE ✧

2022

The collaboration between Prusa Research and Alveo3D began in February 2022, focusing on testing the effectiveness of our filters with Prusa filaments, the conception, etc.



2023

Following the successful tests in 2022, a significant increase in market demand for filters and fans. This marked an important phase in their partnership, highlighting the reliable and efficient Advance Filtration Systems.



2024

Our ongoing collaboration continues to grow, with new Original Prusa XL Enclosure projects in 2024 to further enhance 3D printing safety solutions.



2022_Testing

WE TESTED OUR FILTERS WITH PRUSAMENT FILAMENTS

Phase 1: Initial Testing

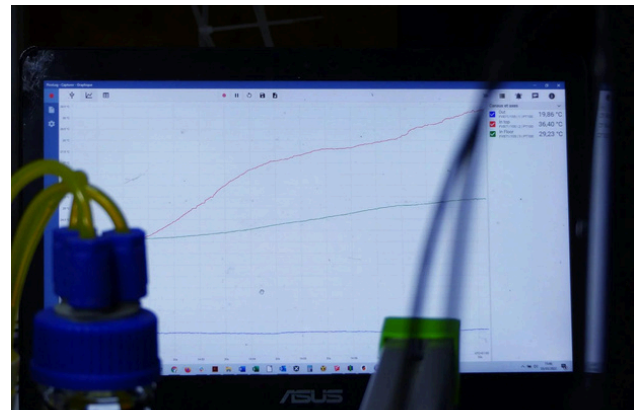
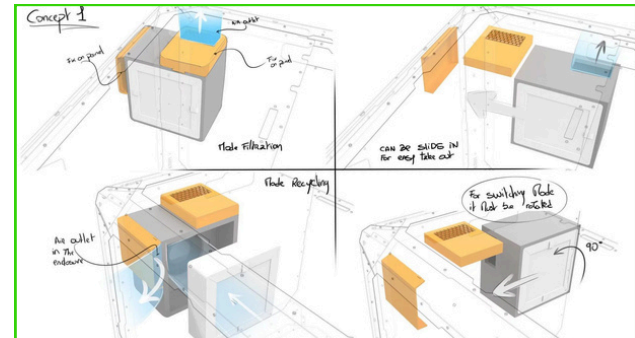
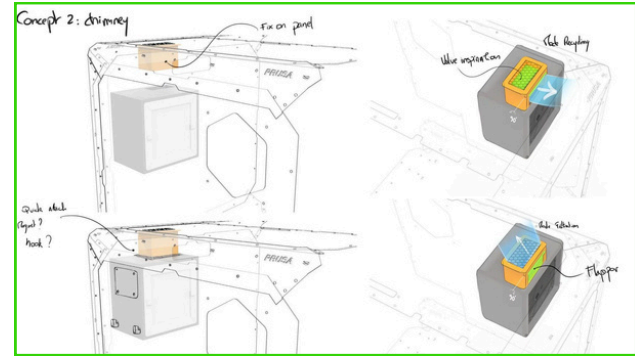
- Began in February 2022, focusing on the efficiency of Alveo3D filters with Prusament filaments.
- Conducted tests with prototypes to identify a filtration system that meets Prusa's specifications.

Phase 2: Customization and Optimization

- Customized filters and fans to optimize the airflow-to-noise ratio.
- Prusa designed the filter and fan support based on Alveo3D's recommendations to enhance performance and longevity.

Phase 3: Testing on Prusa Mk3 Enclosure

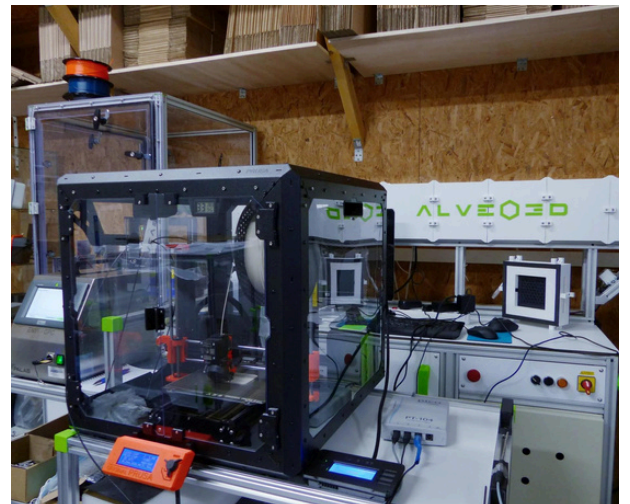
- Aimed to determine the effectiveness of Prusa's solutions in protecting its customers.



Filtering Efficiency Certificate

In March 2022, Prusa Development A.S. received a filtering efficiency certificate from Flexee System S.A.S. for their Prusament filaments, tested using the P3D filter for FDM 3D printers. Filtering efficiency from 7nm to 5000nm particle size with the P3D filter for. The highlights result in the following efficiencies:

- ASA Filament: 94.46%
- PC Filament: 94.96%
- PETG Filament: 95.20%
- PLA Filament: 96.98%



2023 MILESTONE INCREASED DEMAND

ADDITIONAL ADVANTAGES OF ALVEO3D FILTRATION SYSTEMS

PROTECTION

Thanks to its HEPA 13 filter made of cotton and activated carbon, it retains 99.95% of 300 nm particles.

ODOR REDUCTION

Our HEPA filter is engineered to reduce emissions from 3D printers, offering dual protection against VOCs and UFPs.

EASY MAINTENANCE

The Advanced Filtration System is built for straightforward HEPA filter replacement, with a lifespan of at least 600 operational hours



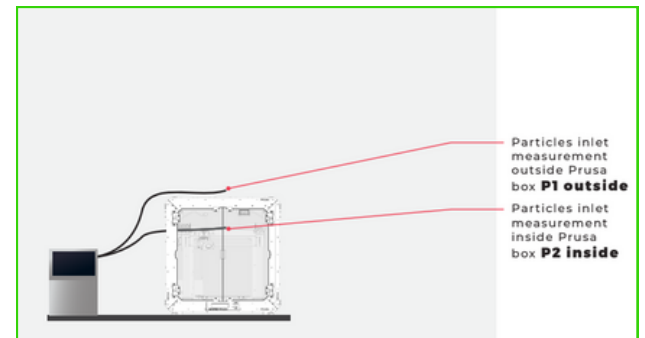
2024 ORIGINAL PRUSA XL ENCLOSURE STUDY WITH PRUSA FILAMENT

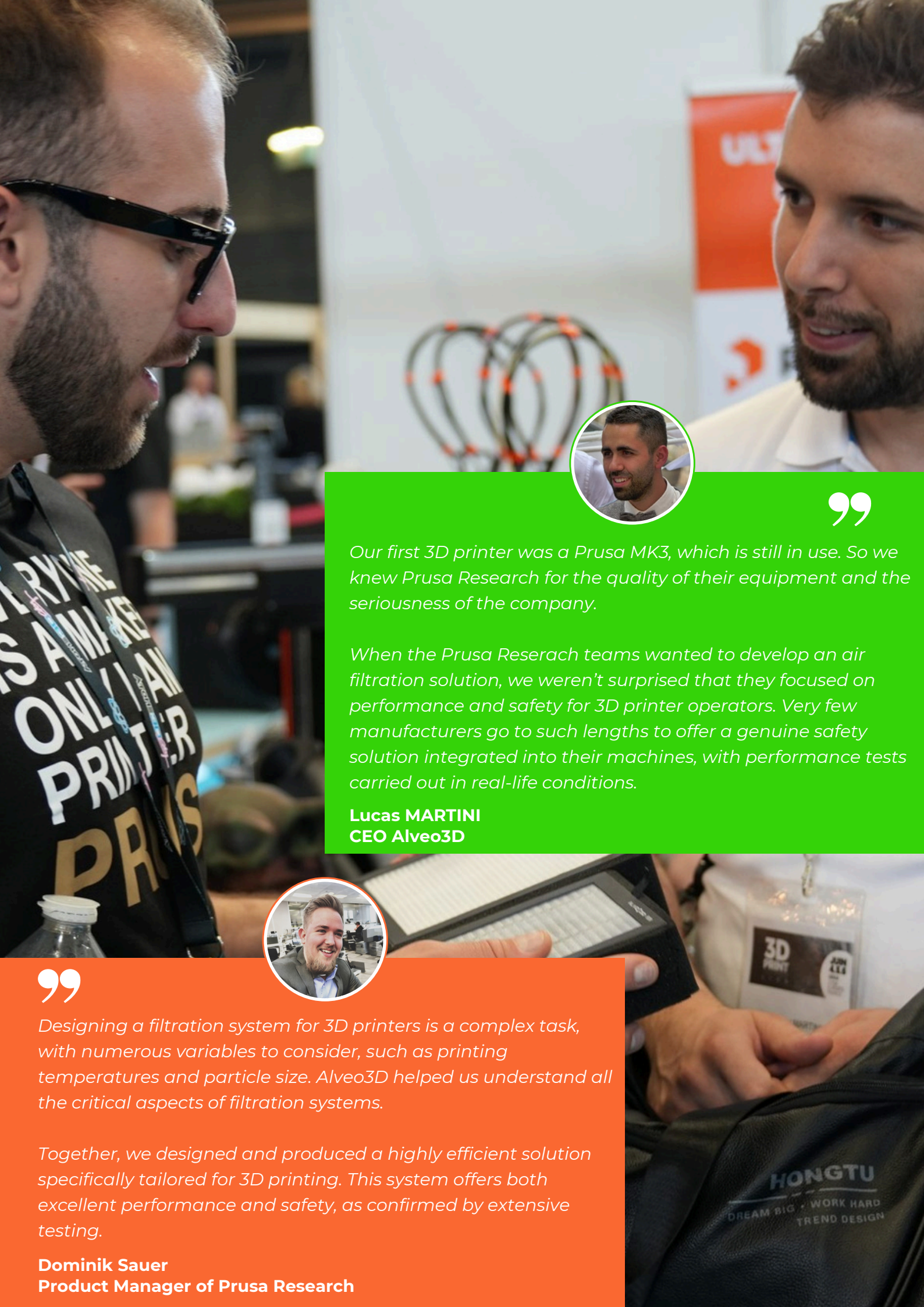
Measurement requirements:

- 1.XL measurement without Enclosure
 - Filaments: PLA, ASA, and PCCF
 - Focus: Measure emissions in an open environment.
- 2.XL measurement with Enclosure
 - Filaments: PLA, ASA, and PCCF
 - Focus: Assess emissions with the enclosure in place.
- 3.XL measurement with Enclosure and Filter Turned On
 - Filaments: PLA, ASA, and PCCF
 - Focus: Evaluate the effectiveness of the filtration system.

Conclusion:

- 1.Overall Effectiveness
 - The Original Prusa XL enclosure significantly reduces nanoparticle emissions for the highly emissive ASA and PCCF filaments.
- 2.ASA Filament
 - High nanoparticle concentration suggests an upgraded filter to maintain safe air quality.
 - Fine adjustment of ventilation is needed to balance thermal requirements and air quality.
- 3.PLA Filament
 - The enclosure mitigates initial concentration peaks, but overall impact on air quality is minimal without the enclosure.
- 4.Ventilation Considerations
 - High ambient temperature required for ASA may demand reduced ventilation speed.
 - Extended post-printing ventilation is essential to manage pollutant levels without causing air leaks.





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Our first 3D printer was a Prusa MK3, which is still in use. So we knew Prusa Research for the quality of their equipment and the seriousness of the company.

When the Prusa Research teams wanted to develop an air filtration solution, we weren't surprised that they focused on performance and safety for 3D printer operators. Very few manufacturers go to such lengths to offer a genuine safety solution integrated into their machines, with performance tests carried out in real-life conditions.

Lucas MARTINI
CEO Alveo3D

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Designing a filtration system for 3D printers is a complex task, with numerous variables to consider, such as printing temperatures and particle size. Alveo3D helped us understand all the critical aspects of filtration systems.

Together, we designed and produced a highly efficient solution specifically tailored for 3D printing. This system offers both excellent performance and safety, as confirmed by extensive testing.

Dominik Sauer
Product Manager of Prusa Research

