

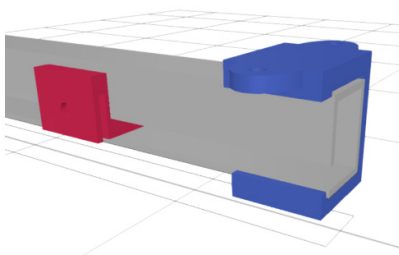


BATTLING THE HEAT WITH RAISE3D'S PRINTERS

Enhancing Home Comfort with a 3D Printed Curtain Track and Rail System

OVERVIEW

With temperatures getting as hot as 35°C in poorly insulated homes, we find ourselves constantly trying to beat the relentless heat. To add insult to injury, the cost of cooling a home in Ontario has increased significantly. Even by keeping your shutters closed, heat can still radiate through your windows. Although there are many cost effective ways to keep your home cool during the summer, the most efficient of the bunch is installing heat blocking or thermal curtains. But what if you have shutters and can't install curtains? One Raise3D customer had a similar issue, and came up with a unique solution.



3D Model of Tension Rod in CAD program

CHALLENGE

When speaking with our client, he described that even with his shutters fully closed; the heat generated from a hot summer day would result in an uncomfortable working environment. Additionally, the strong rays of the sun would cause yellowing on his shutters over time. To solve both these issues, he would need to install a curtain on the inside of his California shutters, however he struggled to find an appropriately fitting tension rod. With the help of his Raise3D Pro3 Plus, he set out to design a custom curtain track and rail system.



Completed Curtain Track & Rail System



PROJECT HIGHLIGHTS



68.89%

Print Time Reduction



14.55%

More Heat Resistance



12.5%

Average Drop in Temperature

SOLUTION

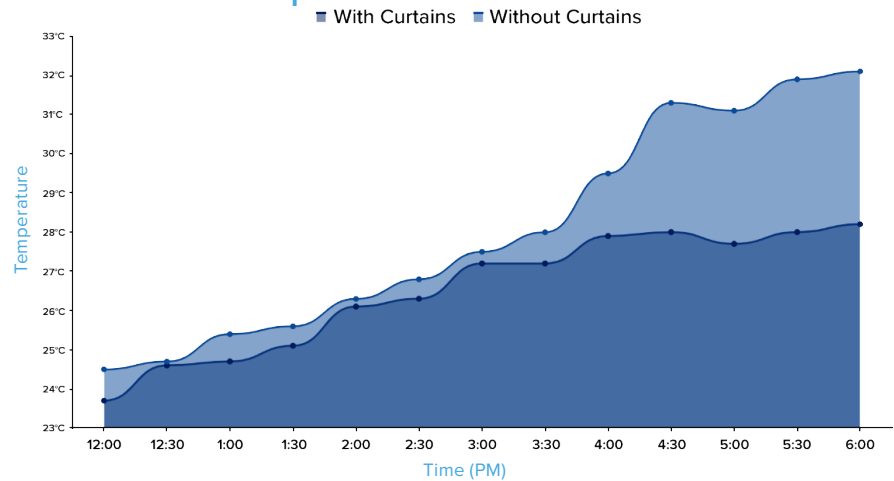
In the realm of rapid prototyping with 3D printing where precision, visual quality, and engineering grade parts hold immense value, Raise3D has emerged best in its class. It's seamless functionality and user friendly operation while combining cutting-edge technology, it's simply unmatched with its versatility.

One main advantage of the Raise3D's Pro3 Plus printer is the extended vertical freedom you gain with the build volume. This enables you to print models as tall as 605mm. Using this to his advantage, he 3D-printed three, 400mm vertical linear tracks. Paired with custom designed mounting brackets, he was able to securely install the system.

During the process of validating a design, parts will often be tested until the desired part is formed. In the case of this project, ensuring that both the track and rail fit well enough to allow for smooth movement was important. When dealing with tolerances this small, there can be many iterations before a functioning part is produced. Thanks to Raise3D's idea maker, small last minute design adjustments were made to ensure smooth functionality of all components.

Within two days of encountering this problem, the design was quickly validated and he produced a functional system for his curtains. Additionally, with the use of Raise3D's hyper speed printing, the print time for 1 linear rail was cut down from 6 hours to 1 hour and 52 minutes, a 68.89% decrease in time. Even with high printing speeds the part quality was not affected.

Temperature Increase Over Time



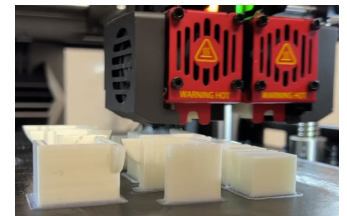
RESULTS

Maintaining linearity in the vertical tracks is an extremely crucial aspect of this project and thanks to Raise3D's well calibrated printers, this task was handled with precision. The curtains can now be opened when the UV index is lower to allow for more light and be closed to keep heat out.

Equally as important as the design, material selection plays a large roll in the functionality of the parts. Since these parts would be in relatively high temperature environments, BASF's Pro1 PLA was selected as the material of choice. In its cold white color it prevents large amounts of heat being absorbed and adds additional strength compared to generic PLA.

FUTURE BENEFITS

The plot above illustrates the significant temperature difference before and after the installation of the thermal curtains. As a result his room was able to maintain a 4°C cooler temperature during peak UV hours. The remarkable capability of his Raise3D Pro3 plus's ability to iterate at hyperspeed while maintaining high dimensional accuracy with tall geometries, heavily aided him in his problem solving. The large print volume enabled him to not limit his creativity and allowed him to produce large parts with stability.



Printing Curtain Track & Rail System (Video)



Installed Curtain Track & Rail System (Video)



UNCOMFORTABLE HEAT

Working environment reached temperatures up to 35°C



BRAINSTORMED SOLUTION

Installing blinds behind the shutters will maintain a cooler environment



DESIGNED & VALIDATED

CAD design was created, test-printed and validated before final print



3D PRINTED

The final design iteration was printed using a Raise3D Pro3+ and tested for fitting



BETTER WORK ENVIRONMENT

Successful installation and a lower ambient room temperature was achieved

Interested in streamlining your prototyping process? Book a free consultation with Shop3D and find out how a Raise3D 3D printer can accelerate your time to market.