SDSU | San Diego State University

IPA RECYCLER

SDSU College of Engineering

PROBLEM STATMENT

The SLA cleaning process requires frequent replacement of the wash medium, isopropyl alcohol, which is costly and wasteful.

The Form Wash – Large V1 requires 10.49 gallons (37.9 L) of isopropyl alcohol at a saturation below 10% to operate correctly. When used daily, the Form Wash L requires the isopropyl alcohol to be replaced monthly.

INTRODUCTION

SLA 3D printing relies on IPA for cleaning, but waste resin quickly saturates it, increasing costs and waste. Our project addresses this by designing an IPA recycling system for the Form Wash L, combining UV light and filtration to maintain IPA saturation below 10% for three months, reducing waste and downtime.

METHODOLOGY

Approach:

- **The filtration system is integrated with Formlabs' Form Wash L.**
- **Incorporate UV light to cure suspended resin particles.**

Key Feature:

- **Subsystems include a buoyancy-controlled switch, filter system, and light box.**

ACKNOWLEDGEMENTS

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FINALIZED DESIGN

1 Light Box

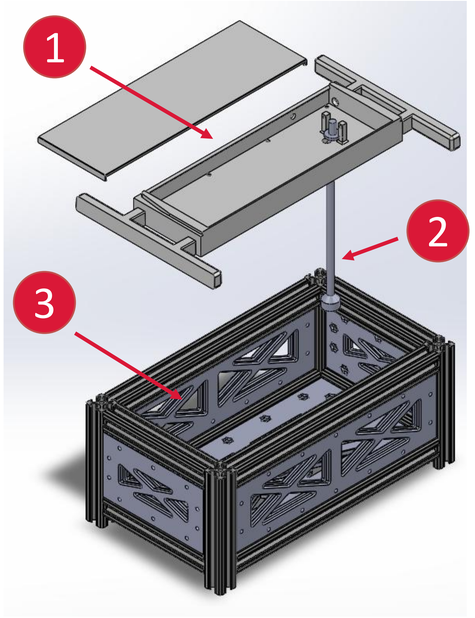
- **Light Box houses a total of 8 UV LEDs as well as a photogate sensor.**
- **The hole at the bottom allows access for the buoyant bobber.**

2 Buoyant Bobber

- **Buoyant Bobber works as an automated ON/OFF switch by having the density of 4% saturation IPA.**
- **The saturation differences allow the mechanism to work.**

3 Filter Housing

- **Filter Housing is an intricate metal housing that allows the filter paper to be securely attached.**
- **Housing has a one-way flow valve to control fluid flow.**



RESULTS

Prototyped Outcomes:

- **Efficient removal of suspended resin while maintaining IPA below saturation limits.**
- **Integration of UV curing and mechanical filtration.**
- **The system meets OSHA safety and operational reliability standards.**

CONCLUSION

The final design provides an effective and sustainable solution for reclaiming IPA. It meets all requirements and clearly demonstrates the importance of iterative testing and integrated design.

ABOUT OUR SPONSOR

Flex Partners, Inc. is a medical device design and development company serving established companies and new venture start-ups.

FLEX PARTNERS, INC VENTURE TECHNOLOGY

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