Articulating Pressurized Isopropyl Alcohol (IPA) Sprayer

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Design Constraints

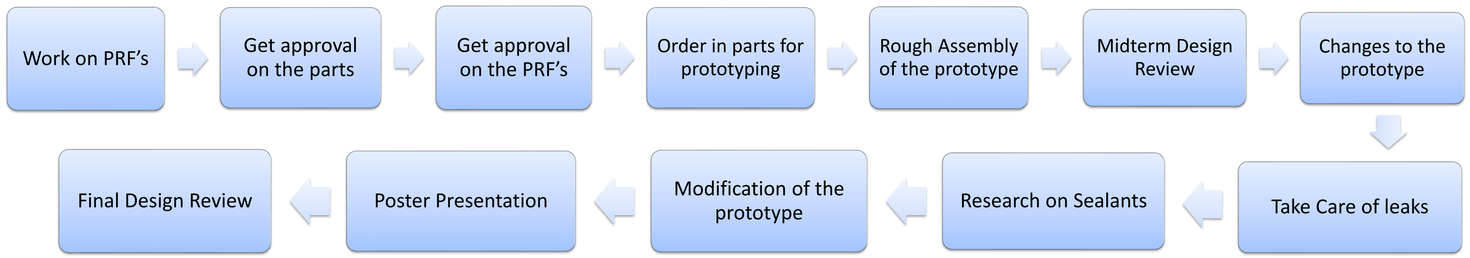
The design of the sprayer should be such that it will:

- Provide 30 PSI targeted IPA spray
- 1 meter insertion depth
- Waterproof and chemical resistant
- Maximum 2 mm diameter
- Singled handed operation
- Ergonomic
- Redundant safety system
- Spark proof electronics/mechanics
- $500-$1000 budget

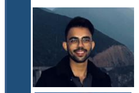
Purpose of the Device

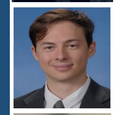
The purpose of this project is to create a flexible isopropyl alcohol (IPA) sprayer to navigate through complex geometries of 3D printed components and to fully coat it with IPA. Our task is to check for foreign object debris (FOD). It will be done by going inside of these parts, spraying IPA, and then going through an inspection process to check for cleanliness.

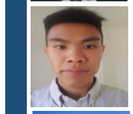
Project Timeline: Winter 2022

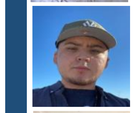


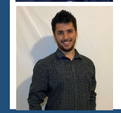
Team Roster


Rishabh Bhushan


Ognjen Cosic


Daniel C. Lai

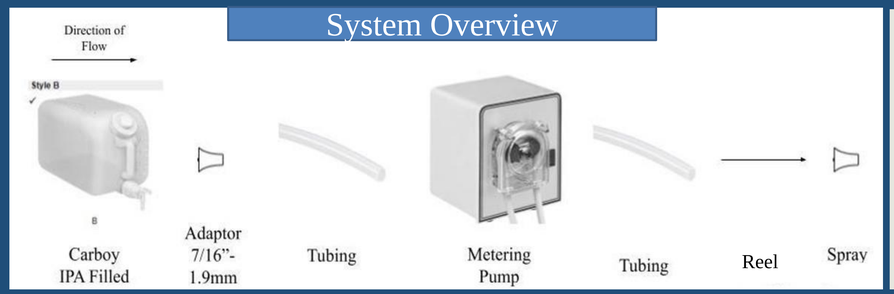

Alexis Fuentes-A

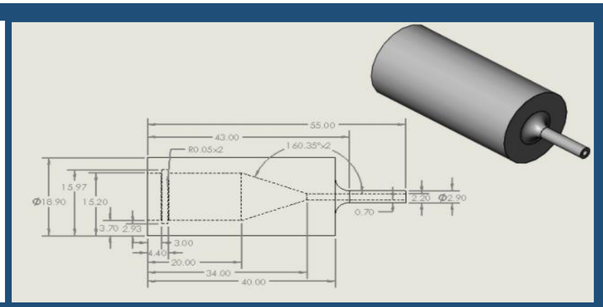

Kameron Cole Ziff

Solution

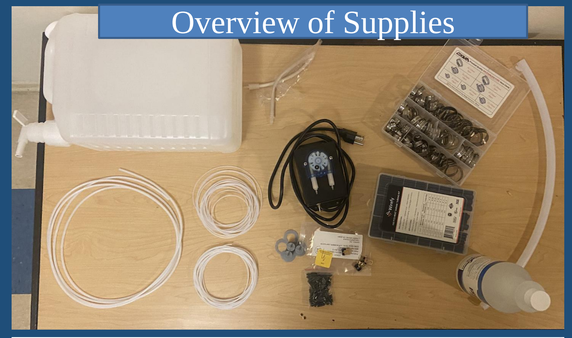
Our primary objective is to coat the internal geometry with IPA as efficiently as possible. We want this product to be user friendly and highly effective. After going through an exhaustive design selection process, our team has finalized on an idea inspired from a drain snake. We will feed in a tube manually where the IPA flow will be powered through a pump.

System Overview

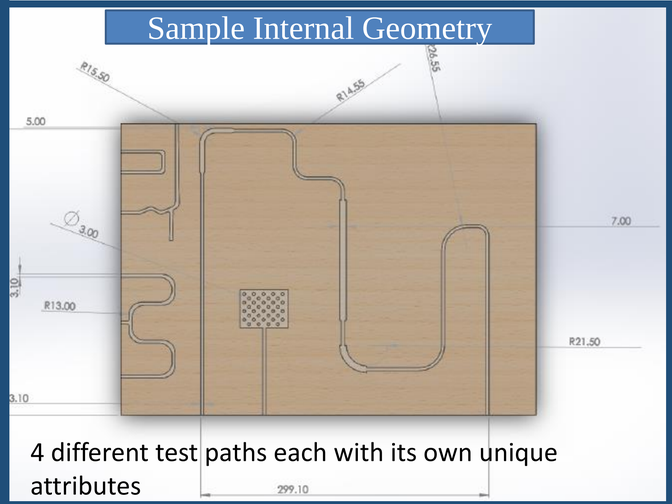




Overview of Supplies



Sample Internal Geometry



4 different test paths each with its own unique attributes

CFD for the Tube Adaptor