2025

Lunzer Engineering Project: Dry Box

CAD +Mechanical Design
Solidworks
Bambu Labs H2D

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Project Overview

Objective

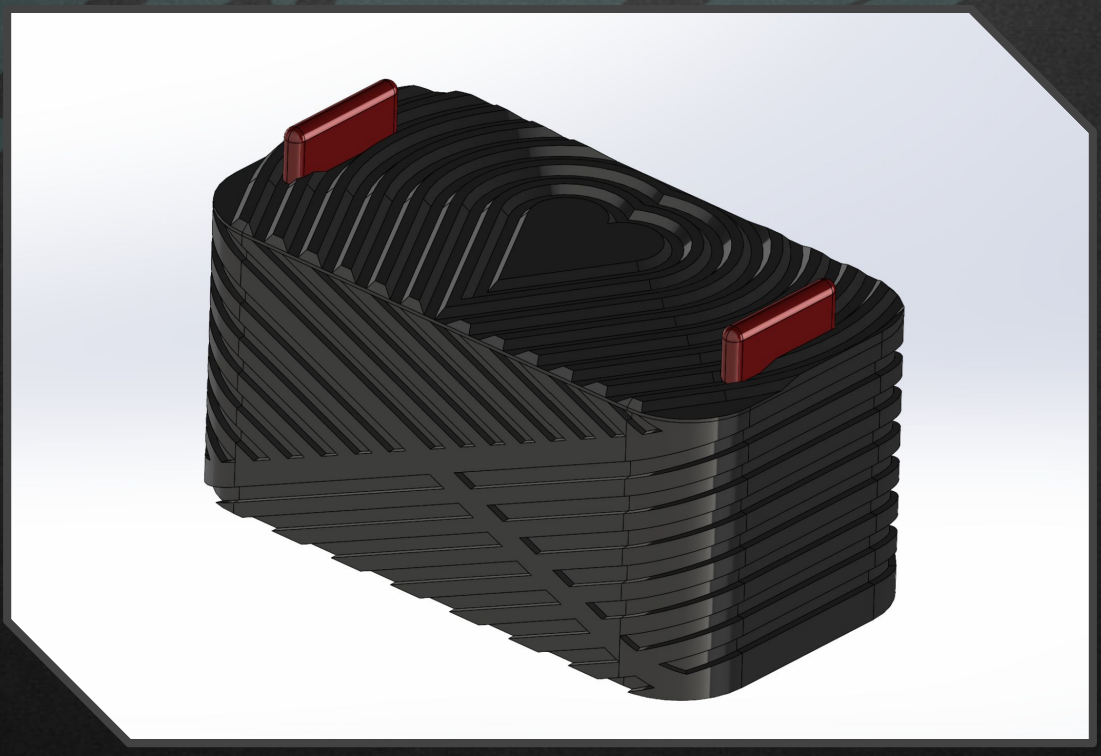
This project was designed to prevent jewelry from tarnishing by creating a sealed storage environment with controlled internal humidity. The system isolates internal air from the environment while actively drying it using desiccant.

Key Features

- Airtight enclosure with TPU sealing system
- Integrated desiccant tray for moisture control
- Removable jewelry trays for organization
- Aesthetic surface-modeled exterior

Applications

Designed for protecting sensitive jewelry from moisture exposure and oxidation during storage.



Design Problem

Background

Jewelry was frequently tarnishing due to exposure to moisture, particularly from wet skin and ambient humidity. Traditional storage solutions did not provide adequate sealing or humidity control.

Constraints

- Must create a sealed internal environment
- Must allow airflow to desiccant
- Compact and user-friendly design
- Visually appealing (gift-quality product)
- Easy access to stored jewelry

Success Criteria

- Reduced moisture inside the enclosure
- Effective sealing from outside air
- Functional and organized storage
- Clean, aesthetic final design

Design Solution

System Architecture

Sealing System

A TPU gasket creates an airtight seal between the lid and the base, isolating internal air from the environment.

Moisture Control

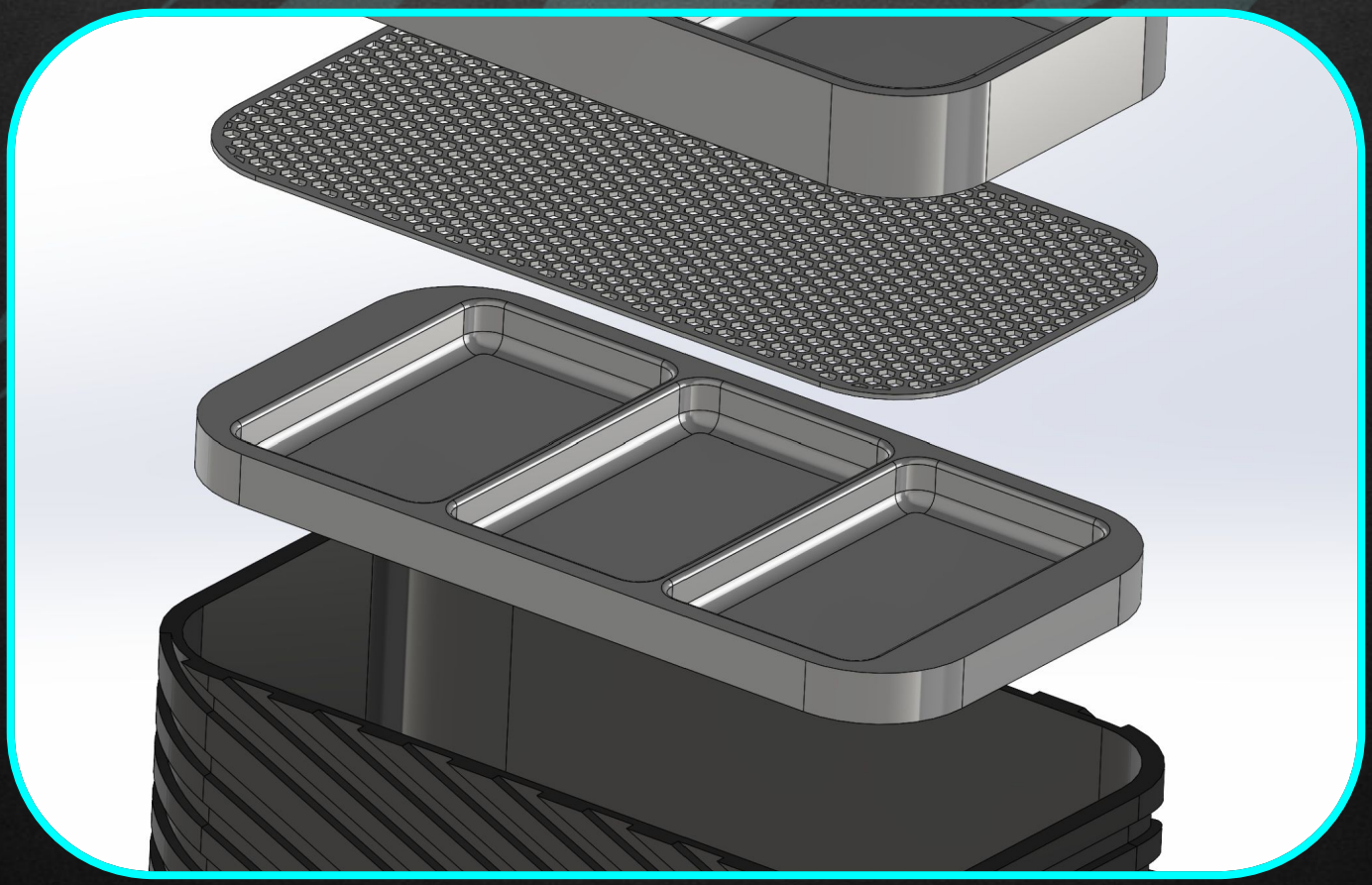
A dedicated lower tray houses desiccant packs to actively remove moisture from the internal air.

Airflow Design

A hex-pattern mesh layer allows air circulation between compartments while keeping desiccant separated.

Storage System

Removable trays provide organized storage for different types of jewelry.



Design & Modeling

CAD & Design Approach

The exterior geometry was created using advanced surface modeling techniques to achieve a smooth and refined appearance.

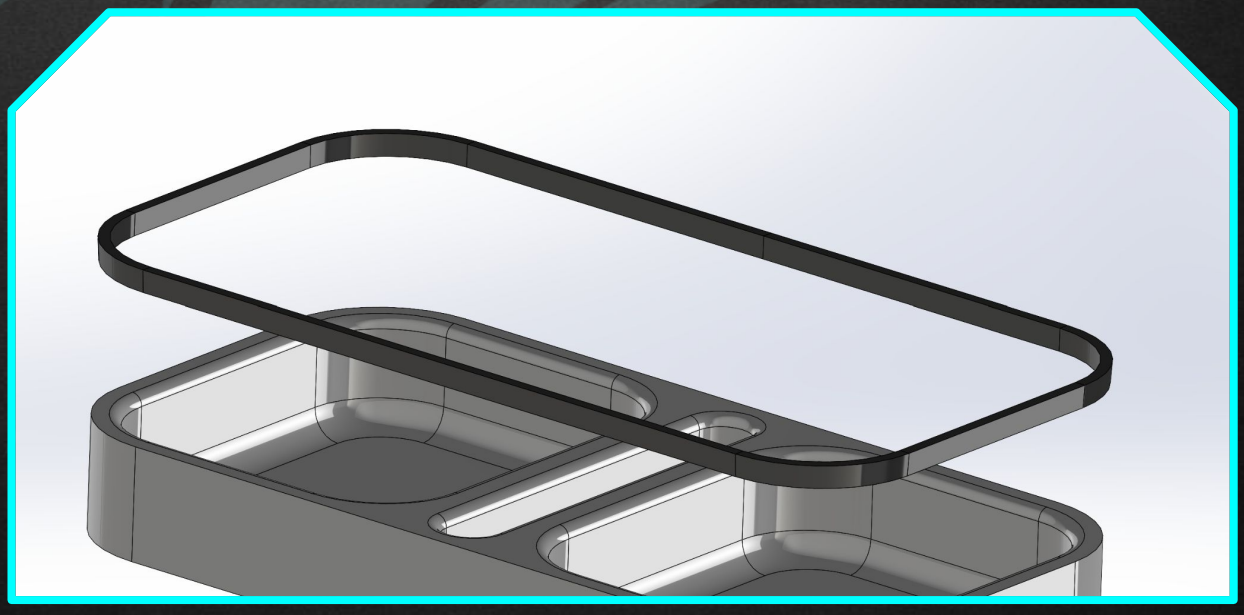
The internal structure was designed around functional layering, ensuring proper airflow and separation between storage and moisture control systems.

Key Features

- Surface-modeled outer shell
- Integrated sealing interface
- Heat-set threaded inserts for handles
- Modular internal tray system

Manufacturing

- 3D printed components
- TPU seal
- Heat-set threaded inserts



Project Outcome

Key Features

- Airtight sealed enclosure
- Integrated desiccant system
- Organized removable trays
- Clean, aesthetic exterior design

Result

The final design successfully reduces internal moisture exposure while providing a functional and visually appealing storage solution.

Future Improvements

- Humidity indicator integration
- Magnetic or latch-based sealing
- Injection-molded version for production