

MQP: Organogenesis - Carrier Design

Major Qualifying Project Report



A Major Qualifying Project Report Submitted to the Faculty of Worcester Polytechnic Institute.

This report is submitted in partial fulfillment of the degree requirements of Worcester Polytechnic Institute. The views and opinions expressed herein are those of the authors and do not necessarily reflect the positions or opinions of Worcester Polytechnic Institute.

Ahad Fareed (ME)

Jameel Gammal (ME)

Angelos Makras (ME)

Professor Ahmet Can Sabuncu, Advisor

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Non-Enabling Abstract

This project aimed to develop a thermal package for a product, utilizing heating and cooling elements to maintain the product temperature at 20-23°C for up to 100 hours. After researching industry standards, current shipping methods, thermal elements, the team developed two novel solutions to fit their sponsor's needs. The first prototype used an electrical configuration to attempt regulating the temperature of the package internally with minimal insulation. The second prototype mimicked the current sponsor's package by being a more cost-effective solution that revolved around thermally insulating the package. The two prototypes were tested rigorously through rough and controlled weather tests to ensure satisfactory conditions. Rough tests were conducted outside in the natural environment whereas controlled weather tests were performed in an environmental chamber. Project results show that the prototypes are effective as they showed the prototypes could sustain variable weather conditions and preliminary structural testing. The team was unable to perform tests longer than 48 hours given the equipment and time constraints, thus the team encourages further testing for each prototype for at least a 72-hour period for to ensure proper results.

The contents of this MQP have been withheld due to intellectual property concerns.