

Product Design Specifications for BME 201 Group 48: Olfactory Device

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Problem Statement:

The aim of this project is to improve or completely re-design a device that is currently used to test fruit flies' olfactory sense, memory, and ability to learn. The current device is producing some inaccurate results because the fruit flies experience changes in air pressure and airflow. Airflow and pressure change need to be kept at a minimum while odors are introduced and cleared from the device.

1. Design Requirements:

The device must meet all of the client requirements

- a. *Performance Requirements:* The device must be durable enough for cleaning and repeated usage for at least 10 years. It should test 100 flies at a time and achieve data of similar or better accuracy than current device.
- b. *Safety:* Electrical system should not kill flies or cause any harm to operators during standard procedures.
- c. *Accuracy and Reliability:* Airflow and air pressure should be monitored and controllable. Results should be reproducible and consistent with previous data.
- d. *Life in Service:* The device must have lifespan of at least ten years.
- e. *Shelf Life:* The device must have a shelf life of five years.
- f. *Operating Environment:* The device must withstand normal room temperature, slight pressure changes, multiple electric shocks, and fly feces.
- g. *Ergonomics:* The device should be able to be operated by a single person.
- h. *Size:* The diameter of the testing and training area should be five eighths of an inch. The device must not occupy more space than one square foot, and must be portable.
- i. *Weight:* The device must not weigh more than five pounds.
- j. *Materials:* The device must be composed of transparent materials that are able to withstand thorough cleaning and electric shock. All of the inside surface must be able to deliver a shock of 70 volts.
- k. *Aesthetics, Appearance, and Finish:* The device must be transparent and have a smooth finish.

2. Production Characteristics:

- a. *Quantity:* One reproducible working prototype is necessary.
- b. *Target Product Cost:* Unknown at this time

3. Miscellaneous:

- a. *Standards and Specifications:* Normal lab safety specifications for odors.
- b. *Customer:* The customer prefers a device that produces more accurate and reproducible results than the current model.
- c. *Patient-related Concerns:* None
- d. *Competition:* Current device is being used in lab and producing somewhat accurate results.