

Ergonomic Nutritional Laboratory Container Opener
Preliminary Product Design Specifications
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Function:

An ergonomic laboratory container opener is a device that is capable of opening variable sizes of laboratory containers with minimal effort exerted by lab technicians. Openers range from manually operated to entirely automatic. Manual openers are beneficial because they are able to open variable sizes of containers. However, they generally fail to require a low amount of force exertion from the user. Automatic openers are ideal in reducing user effort, but are often less lenient in the range of container sizes that they are capable of opening. Covance, a commercial food testing laboratory that consists of over 400 employees, follows a protocol which requires them to repeatedly cap and uncap up to 100 laboratory containers each day. The goal is to design a laboratory container opener that significantly relieves strain from lab technicians' hands and fingers.

Client Requirements:

The laboratory container opener must open containers with minimal manual intervention. It must be capable of opening laboratory containers in a variety of sizes; specific size range will be determined upon a tour of Covance laboratories. The container opener should operate in a timely manner and maintain function after excessive use. A budget has not yet been defined, but a reasonable cost for a product of this type would make it more attractive to relevant companies.

1. Physical and Operational Characteristics:

a. Performance Requirements:

The most important function of the opener is to open laboratory containers with minimal manual force. The jar opener must withstand excessive use and function in a timely manner to accommodate the constant use of the device.

b. Safety:

The design of the opener must account for potential device failures, and any harmful device components must be properly contained so that the user is not harmed by the laboratory container opener.

c. Accuracy and Reliability:

The container opener must function in a reliable, consistent manner to avoid setbacks in the lab.

- d. Life in Service:
The laboratory container opener must maintain functionality while being used upwards of 5,000 times per day.
- e. Shelf Life:
All materials used in fabrication of the opener must have abundant shelf lives to ensure that the container opener operates successfully over an extended period of time.
- f. Operating Environment:
The container opener will be operated in a nutritional laboratory, meaning it must be sterile, resistant to potential spills, and able to withstand abundant use.
- g. Ergonomics:
The operation of the device must be straightforward and efficient for lab technicians to use.
- h. Size:
At largest, the laboratory container opener should be small enough to be installed on a lab bench. The component of the opener which contacts the laboratory containers must be adjustable to account for variable container sizes.
- i. Power Source:
The only potential device component that would require power is a motor, which would be powered through an outlet.
- j. Weight:
The weight of the laboratory container is not entirely crucial, since it will be stationary. However, it must be light enough to be installed on the top of a lab bench without causing damage to the surface.
- k. Materials:
Metals, polymers, and plastics are all materials that could be used to fabricate the device. Additionally, to accommodate a variety of container sizes, rubber to grip the container and gears to adjust the size of the opener could also be utilized.
- l. Aesthetics, Appearance, and Finish:
The opener must be functional and easy to handle. It should resemble a professional piece of laboratory equipment.

2. Product Characteristics:

a. Target Product Cost:

The target product cost of the device has not yet been specified, but will be within reason for the customer.

b. Quantity:

Ideally, a one-size-fits-all opener will be made to accommodate for various laboratory container sizes. Multiple openers will be made, if necessary, to cover all container sizes.

3. Miscellaneous:

a. Standard and Specification:

No additional approvals are necessary for this project.

b. Patient-Related Concerns:

The finished product must maintain sterility upon use, especially in areas that come into contact with laboratory containers.

c. Competition:

i. Manual Opener:

Manual openers alleviate some strain from users when opening containers. However, since laboratory technicians must open an excessive amount of containers each day, this strain is still too great.

ii. Automatic Opener:

In general, automatic opener devices are operated by a single touch. They rotate around jars to open them, and are adjustable in size to open a variety of container sizes. However, these devices are quite small, require AA batteries, and therefore are not entirely powerful. Additionally, it is not likely that their ranges are wide enough to open the variety of container sizes requested by the client.

d. Customer:

The customer for this project is Covance, a globally known drug development and research company based in Madison, WI. The design will be made to open any style of container, research or household.