

# Prosthesis Disinfectant and Deodorizer – Fall 2007

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**Function:** The liners of prosthetic devices must be sterilized and/or deodorized on a regular basis. Currently, this process is lengthy and inefficient. This can lead to unsterile conditions if proper maintenance is not applied and consequently infections may result. The goal of the project is to research and design a method that simplifies cleaning/disinfecting prosthetics. The scope of the project includes the investigation of germicidal lamps and deodorizing substances such as titanium dioxide.

## **Client requirements:**

- Determine optimum wattage and duration of exposure for different silicone materials
- Determine effect of UV-irradiation and quantitative analysis on silicone materials
- Determine quantitative analysis of odor reduction
- Determine cost analysis of titanium dioxide coated aluminum mesh

## **Design requirements:**

### **1. Physical and Operational Characteristics**

#### *a. Performance requirements:*

- Must deodorize to satisfactory level
- Must sterilize prosthetic liners to safe predetermined scales
- Must be easy to use
- Must not damage prosthetic materials
- Must not radiate extensive heat

#### *b. Safety:*

- UV radiation is harmful to the eyes and skin that is exposed; prototype must incorporate safety precautions during use considering the target audience
- Temperature or long duration induced auto-shutoff
- Stable base to prevent falling over

#### *c. Accuracy and Reliability:*

- Because of the nature of this product and its influence on the health of the users, it must be a reliable tool to disinfect prosthetic liners
- Maintain functionality on a per day basis

d. *Life in Service:*

- Determined by bulb specifications; at least 3 years

e. *Shelf Life:*

- Determined by bulb specifications; at least 10 years

f. *Operating Environment:*

- Prepared for use in dusty environment
- Must function safely indoors

g. *Size:*

- Must adequately accommodate liner without stretching
- Movable stand
- Small space need for operation

h. *Weight:*

- Weight is under 12 lbs

i. *Materials:*

- Oil may not be used in any form
- Plastics that will not melt under UV-irradiation
- Metals
- Titanium Dioxide
- Silicone
- TUV bulbs
- Electrical wiring

j. *Aesthetics, Appearance, and Finish:*

- High aesthetic appeal

## **2. Production Characteristics**

a. *Quantity:* one

b. *Target Product Cost:* \$100, pending market demand

### **3. Miscellaneous**

#### *a. Customer:*

- Easy and reliable liner-cleaning method
- Minimal effort
- Target audience includes prosthetics users of all ages; specially the elderly