

# TECHNOLOGY RESEARCH

## DISPLAY (FOR THE SETTINGS)



### Transparent OLED Development Kit

Part Number: CFAL12856A0-0151-B-E1-2

Want to get your transparent OLED up and running fast? This transparent OLED development kit is shipped ready to go, so all you have to do is apply power via the included USB cable. Then you're ready to get down to the fun part of creating. This kit ships assembled and loaded with some demo code that can be modified or replaced with your own.

Includes:

- [Transparent OLED display](#)
- [CFA10105 breakout board](#)
- [Seeeduino](#) (Arduino clone that is 3.3v/5v switchable)
- [Jumper wires](#)
- [Micro-USB cable](#)



**CrystalFontz**  
We have a display for that!

Home Products Support Blog Vid

Home > Products > OLED Displays > Clearing > Resolutions > 128x56

### 128x56 Transparent OLED Display

Part Number: CFAL12856A0-0151-B

Black on clear, cutting-edge transparent OLED display! Also known as TOLED, 128x56 (1.01 inch) As you can see from the image, this OLED is super-bright, monochrome display. The pixel color is a light-clear when it just about 70% transparent when not lit. There are actually 144 rows, however the bottom 8 rows have the "padding" so those pixels aren't visible from the back.

This display supports parallel, I2C, and SPI interfaces. We powered it up using an 3.3v Seeeduino/Arduino UNO Clone and a small break-out board. This OLED uses the super common Sovomon System 850130B integrated controller.

Check out the schematic in the download to see how to wire this transparent display to your microcontroller. You'll need a few easily-sourced components.

This is a 3.3v device, plugging it into 5v can permanently damage this module.

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### OLED Breakout Board

Part Number: CFA10105

This adapter board simplifies the process of bringing up some of our OLED displays including the transparent OLED and the 1.3" OLED in white and our 1.3" yellow OLED. With this adapter board, these OLEDs can be powered and run by a 3.3v microcontroller without a separate power supply. That means all you need is this board and a Seeeduino to run the display - no other components, no extra power supply.

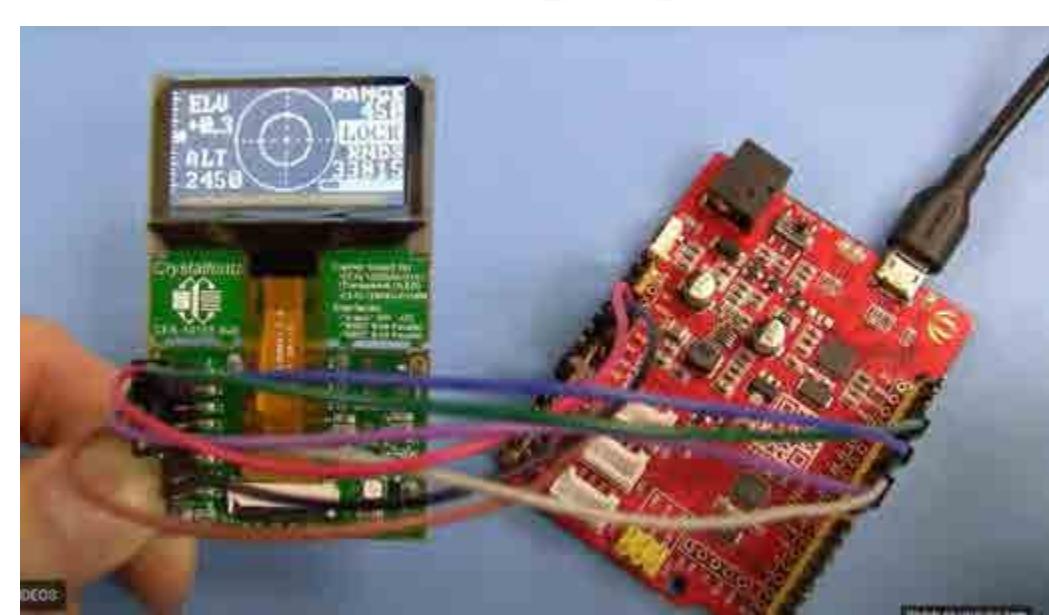
This board supports interfacing with the display using SPI, I2C, 8080, and 8088. Two jumpers on the board control the interface. They also open for communication using SPI but can easily be closed with solder or external wires.

There are two options for mounting an OLED to this board, and tape is included on the board for whichever option you choose. The first option is to mount the display on the gold pins - this is a score for the development as you don't need any of the solder. The other option is to plug the board into the display. This makes a nice small form factor, but unfortunately the board itself isn't transparent, so we recommend this option for the non-transparent OLEDs only.

The back of the board is printed with a quick and easy guide for the different interfaces. We love the board and think you will too!

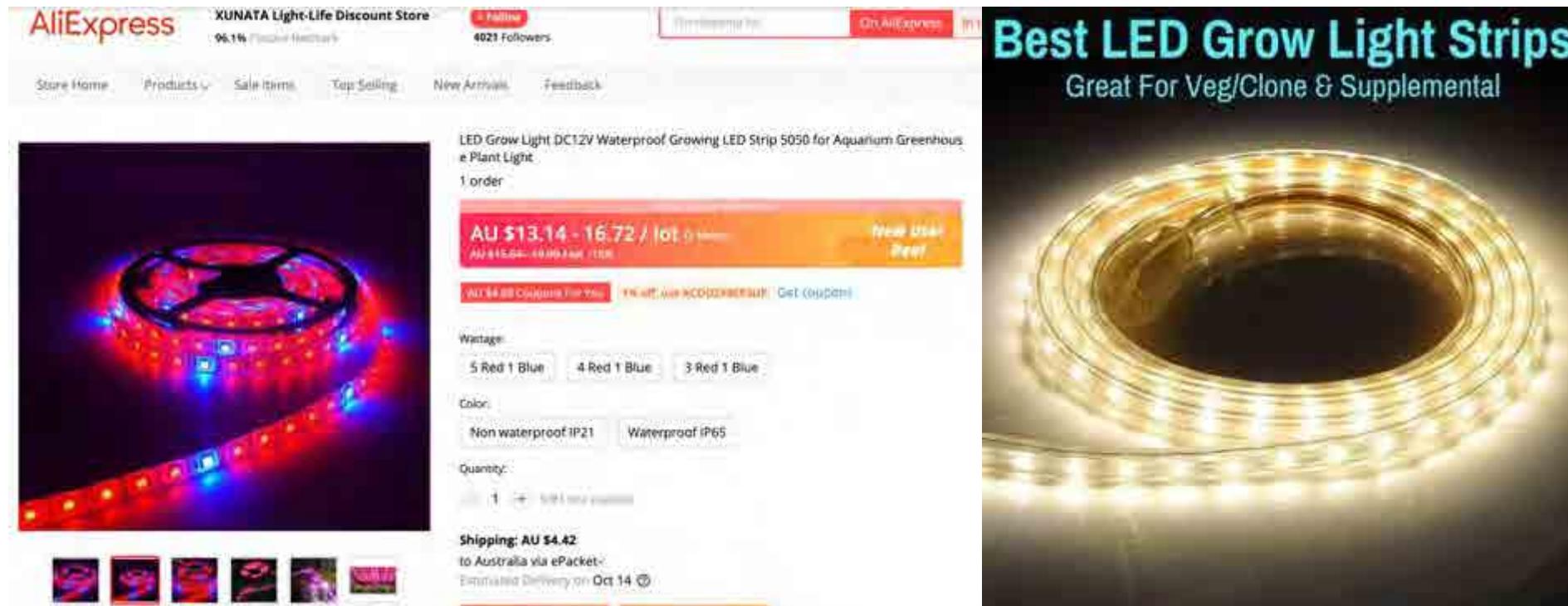
- Single 3.3v required to power the OLED (usually 3.3v & 12.5v)
- It has a voltage regulator for the 12.5v rail
- Configurable jumpers to change the interface between parallel, I2C, or SPI
- Two options of mounting available - tapes visible for the transparent and the non-transparent displays can wrap around and wear the adapter board like a backpack
- SPI & I2C can be controlled by jumpers or by external wires

This breakout board was specifically designed for these OLED display modules.



# TECHNOLOGY RESEARCH

## GROW LIGHTS

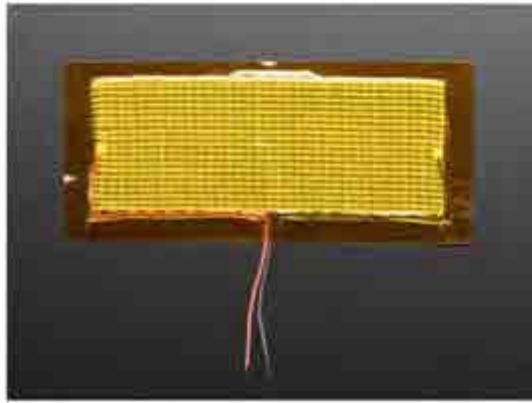


The image shows a screenshot of an AliExpress product page for 'LED Grow Light DC12V Waterproof Growing LED Strip 5050 for Aquarium Greenhouse and Plant Light'. The page includes a navigation bar with 'Store Home', 'Products', 'Sale Items', 'Top Selling', 'New Arrivals', and 'Feedback'. The product title is 'LED Grow Light DC12V Waterproof Growing LED Strip 5050 for Aquarium Greenhouse and Plant Light'. The price is listed as 'AU \$13.14 - 16.72 / lot (5 meters)'. There are options for 'Wattage' (5 Red 1 Blue, 4 Red 1 Blue, 3 Red 1 Blue) and 'Color' (Non waterproof IP21, Waterproof IP65). The quantity is set to 1. Shipping is 'AU \$4.42 to Australia via ePacket' with an estimated delivery on Oct 14. To the right of the screenshot is a separate image of a glowing yellow LED strip with the text 'Best LED Grow Light Strips Great For Veg/Clone & Supplemental'.

- Superbright 5050 SMD LED, high intensity and reliability Waterproof flexible LED strip 60 SMD LEDs per meter, total 300 LEDs for 5 meters Self-adhesive back with double side adhesive tape Maintenance free, easy installation Every 3-LED cutable without damaging the rest strip Flexible ribbon for curving around bends Ultra-bright but running at low temperature Input volts: DC 12V
- High brightness
- Quantity of leds : Red/Blue: 3:1/5:1/4:1  
Viewing Angle : 120
- Wavelength: Red 625-660nm; Blue: 450-465nm
- Long life span 50,000+ hours

# TECHNOLOGY RESEARCH

## HEATING PAD (TEMPERATURE REGULATION)



**Electric Heating Pad - 14cm x 5cm**  
\$10.80  
ADD TO CART

**Security Overview**  
100% Secure Payments  
24/7 Secure Shopping  
In-stock, please allow 2-3 business days for delivery before 2PM.  
Reviewed by TSL 22/01/2018

**Brand: Adafruit**  
Make a product for this product

**DESCRIPTION** | REVIEWS | SHIPPING | RELATED PRODUCTS

This is both Littonix Army 5-12VDC and the stainless steel fibers in this heating fabric will warm up, creating a little heating pad. On one hand, it's just a graphic resistor. On the other hand, it's flexible, light, and can be wrapped around a project. Originally designed for portable reusable heating pads, this fabric can be used for woodburner, sweater heaters, DIY-ego projects, thermal cycling for materials testing, etc.

The temperature reached varies with voltage. Note that when the data/over sheet says 15cm, it's more like ~14cm long. Check the user's notes in the Product Details tab for a table of voltage/current/temperature outputs. You could PWM it with a power N-channel transistor if you want finer temperature control.

We also have a smaller version of this heating pad.

SOURCE: [https://core-electronics.com.au/electric-heating-pad-14cm-x-5cm.html?utm\\_source=google\\_shopping&qclid=CjwKCAjwhaakBhBcEiwA8acsHMckOZWYvLHKYadT4U1SKbBcVin5V5GU68ukZf9mqy0TV2-dT2VQRoC2EQQAvD\\_BwE](https://core-electronics.com.au/electric-heating-pad-14cm-x-5cm.html?utm_source=google_shopping&qclid=CjwKCAjwhaakBhBcEiwA8acsHMckOZWYvLHKYadT4U1SKbBcVin5V5GU68ukZf9mqy0TV2-dT2VQRoC2EQQAvD_BwE)

## AXIAL FAN (AIR CIRCULATION)



**Cooler Axial Fan 12V 40x40x10mm For Arduino Raspberry Pi Computer 3D printer**  
Brand: ManeePowerAlice

- Features: 100% Brand New and High Quality! Extends the life of your video card by keeping it cool. , Efficient heat dissipation. , With a 2-pin female connector. , Easy installation and use.
- It's brand new, good quality & high performance. \*\* PLS PAY ATTENTION the accurate size & voltage rate before placing order in order to avoid buying wrong thing. Free Shipping & the deliver time to USA is approx. 10-18 days after the shipment date.

See more product details

Roll over image to zoom in

**Product description**  
Application: For Arduino Raspberry Pi/Arduino Nano/3D printer. Package included: 1xPC Cooling Axial Fan 12V 40x40x10mm For Arduino Raspberry Pi 50-pin female connector.

Product Information		Additional Information	
<b>Technical Details</b>		<b>Additional Information</b>	
Manufacturer	ManeePowerAlice	SKU	12V-40x40x10mm
Part Number	Module 12V	Early Bird Available	

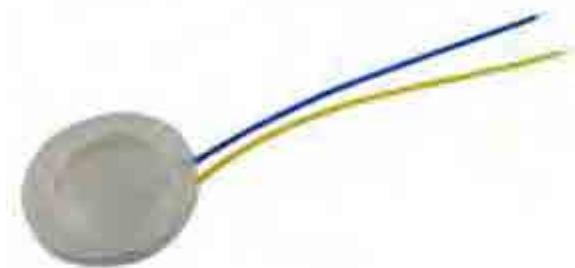
SOURCE: [https://core-electronics.com.au/miniature-5v-cooling-fan-with-molex-picoblade-connector.html?utm\\_source=google\\_shopping&qclid=CjwKCAjwhaakBhBcEiwA8acsHNIbEZYikDilyp\\_pUO8UG6JX-ixv3v83B9FQMO9UkEsawy4mzKhFBocUKwQAvD\\_BwE](https://core-electronics.com.au/miniature-5v-cooling-fan-with-molex-picoblade-connector.html?utm_source=google_shopping&qclid=CjwKCAjwhaakBhBcEiwA8acsHNIbEZYikDilyp_pUO8UG6JX-ixv3v83B9FQMO9UkEsawy4mzKhFBocUKwQAvD_BwE)

# TECHNOLOGY RESEARCH

## MIST MAKER (HUMIDITY REGULATION)

### M165D25

Ultrasonic Atomizing Transducer, 25 mm, 1.65 MHz



**pro**wave

Manufacturer:	PROWAVE
Manufacturer Part No:	M165D25
Order Code:	1007369
Technical Datasheet:	<a href="#">M165D25 Datasheet</a>
	<a href="#">See all Technical Docs</a>

Pro-Wave has dedicated in ultrasonic field over 19 years since 1980 and earned a worldwide reputation for his specialty, flexibility and sincerity in the past decades.

The ultrasonic atomizing transducers using our factory made high Q hard type piezoelectric ceramic element is ideal for atomizing liquids. A very fine mist having a particle diameter of only a few microns can be generated.

We are not only supply atomizing element but also entire assembled transducer unit with silicone rubber holder.



[Add to compare](#)

Image is for illustrative purposes only. Please refer to product description.

151 total stock globally [View stock](#)

141 On stock available for 5-8 business days delivery

We're working to meet the stated delivery time frame. However, there may be a delay due to the current global pandemic. We appreciate your patience.

\$21.12 (\$23.23 inc. GST)

Price for: Each

Multiple 1 Minimum 1

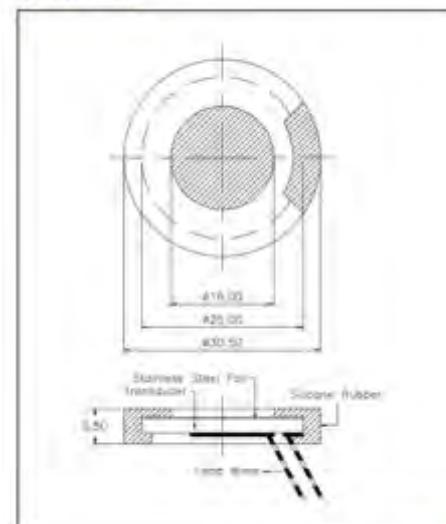
Quantity	Price (incl GST)
1+	\$21.12 (\$23.23)
25+	\$20.31 (\$22.34)
100+	\$19.50 (\$21.55)

Request a quote for larger quantities

Qty 1

[Add to Basket](#)

#### Dimensions



#### Features

- Piezoelectric ceramic element clad with stainless steel for erosion resistance.
- Fine and consistent particle size of less than 3µm
- High atomizing efficiency >400 cc/hour
- Less power consumption
- High stability and durability

#### Applications

- Humidification in refrigerated food displays and storage, living environments, and air conditioning plants.
- Inhalation and disinfecting equipment
- Humidification in industrial process control for lubrication, coating and etc.

SOURCE: [https://au.element14.com/prowave/m165d25/ultrasonic-liquid-atomiser-1-65mhz/dp/1007369?gclid=CjwKCAjwhaaKBhBcEiwA8acsHMni9sBEJ0ll-9DkISXqWzimla9Q1kV-VpNeoU0m\\_sW6E\\_Cnl4gYJhoCbhlQAvD\\_BwE&mckv=dc%7Cpcrid%7C543135799372%7Cpkw%7C%7Cpmt%7C%7Cslid%7C%7Cproduct%7C%7C](https://au.element14.com/prowave/m165d25/ultrasonic-liquid-atomiser-1-65mhz/dp/1007369?gclid=CjwKCAjwhaaKBhBcEiwA8acsHMni9sBEJ0ll-9DkISXqWzimla9Q1kV-VpNeoU0m_sW6E_Cnl4gYJhoCbhlQAvD_BwE&mckv=dc%7Cpcrid%7C543135799372%7Cpkw%7C%7Cpmt%7C%7Cslid%7C%7Cproduct%7C%7C)

# FURNITURE/ART IMAGES INSPIRATION

## GLASS AND WOOD



INCORPORATE IN MY DESIGN:  
-**Natural colors:** brown, ..  
-**Natural materials** wood,  
-**Textures,**  
-**Organic shapes/elements** to support biophilic design

# PRODUCT INSPIRATION

## GLASS AND WOOD



THE LID from this water bottle has an over mold/insert design on the outside sits the wood and on the inside which is in contact with the water it has a plastic insert part.

I could use a similar idea on the lid of my design the inside of the part that will be in contact with water/humidity would be in plastic and the outside would be a wood cover over the plastic part.

# DESIGN DEVELOPMENT

## Base and top design iterations

**TOP/LID & BASE**

Think about the base.  
At the moment there is no a focus, but a conflict btw the table top design & the base design, so a conflicting visual weight composition. The eye doesn't know where to look.

**TOP appearance...**

---

**CURRENT**

make one of the parts the focus.

**ITERATIONS**  
BASE (iterations...)

---

**LIGHT**

---

**ELECTRONICS location.**

① TOP?

② BASE

### BASE DESIGN ITERATION:

- Currently there is no hierarchy in the visual weight of the top and base, make one more dominant and the focus than the other one.
- The base will be thinner and more streamline incorporating removable stand base that can be used either on floor or on table.

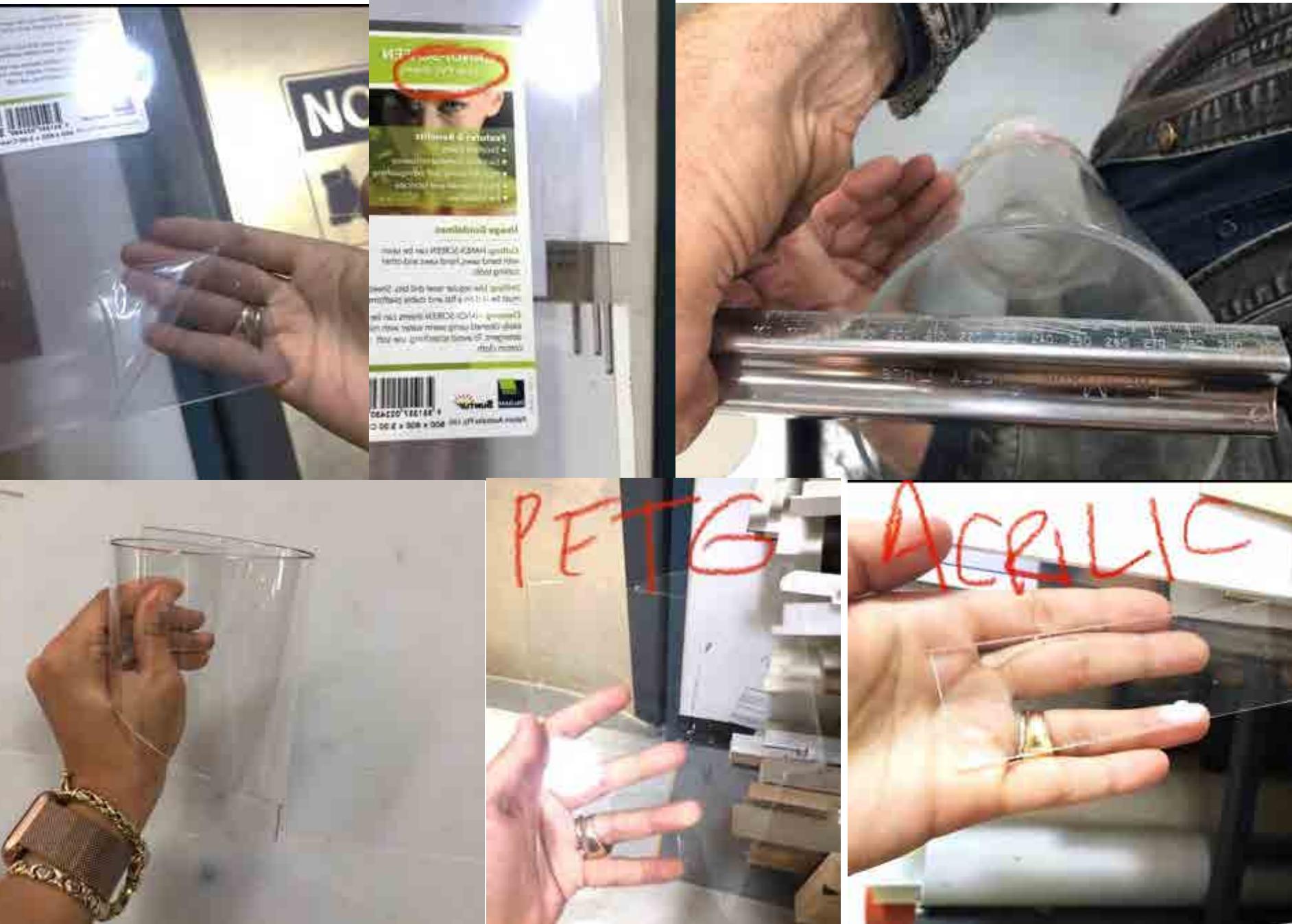
# DESIGN DEVELOPMENT

GLASS AND WOOD



# PROTOTYPING FORM

## MATERIAL FOR FINAL PROTOTYPE



MATERIALS FOR MAIN BODY (PROTOTYPE).

- Exploring different materials and talking to workshop guys about most suitable material for the main part the cylinder.
- Materials recommended (acrylic and polycarbonate)

- If choosing a sheet, it had to go through a heating process to be able to curve it after in a roller.
- If choosing a sheet where the to ends meet will be joint and that joint wont be flashed it will overlap and might not look nice as I am restricted with only being able to use transparent materials on main body.

-MOST APPROPRIATE MATERIAL OPTION FOR MAIN BODY will e a cylinder with the desire diameter and cut to length if aesthetics is important.

# PROTOTYPING FORMS

DESIGN AND FORMS main body and removable top



# PROTOTYPING FORMS

DESIGN AND FORMS main body and removable top



# PROTOTYPING FORMS

DESIGN AND FORMS main body and removable top



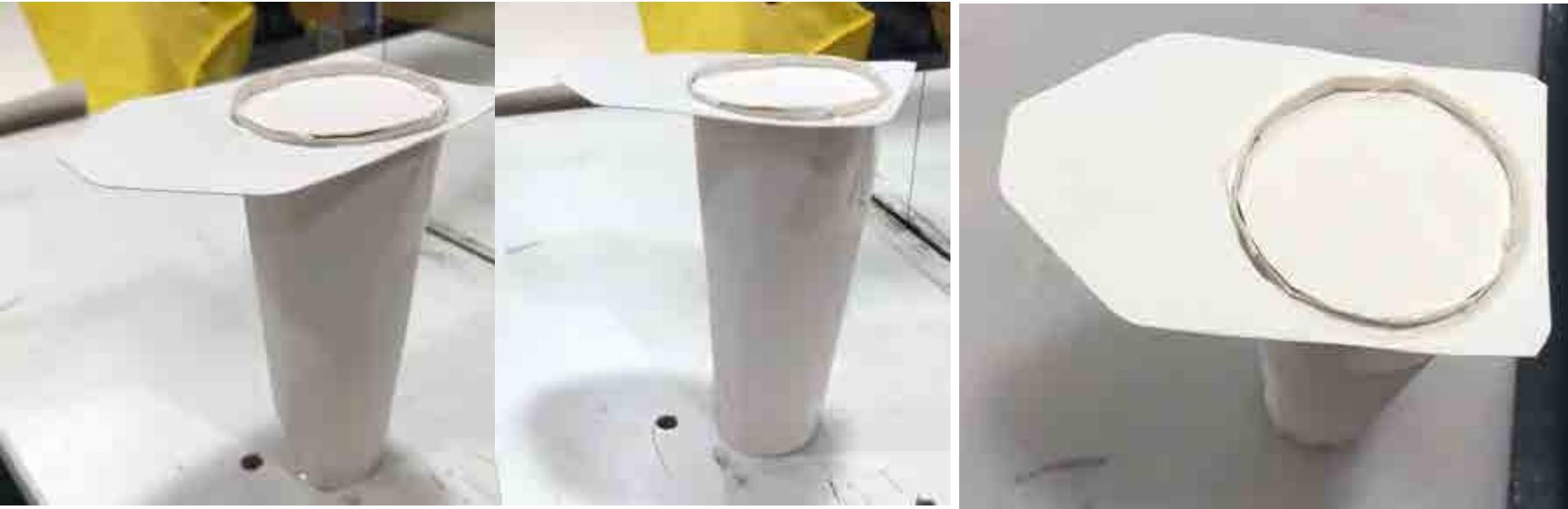
SCREEN DISPLAY:

-Changed location from the main body, on the side of the product to now the top of the product so the wood could be users to hide some of the electronics of the product



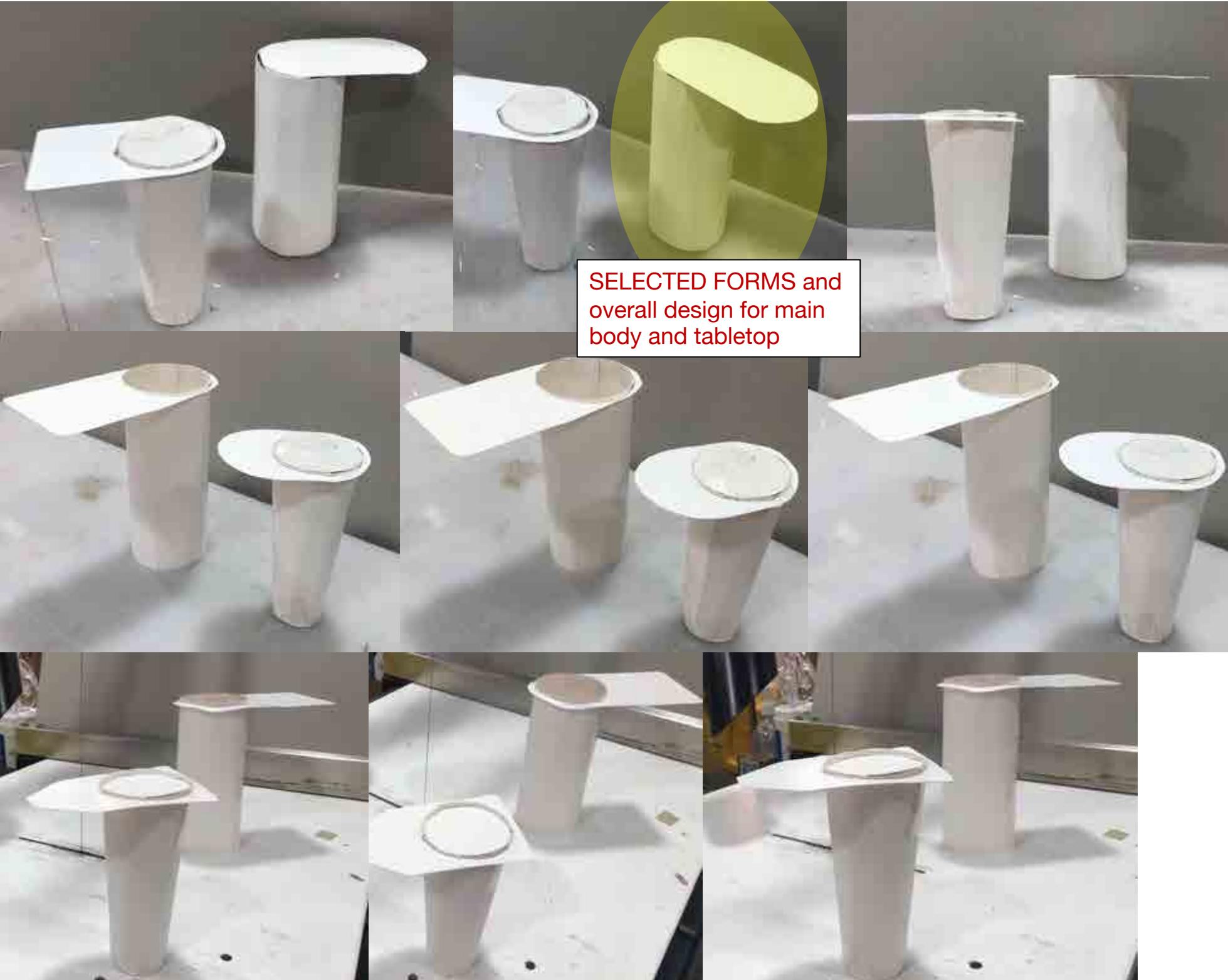
# PROTOTYPING FORMS

DESIGN AND FORMS main body and removable top



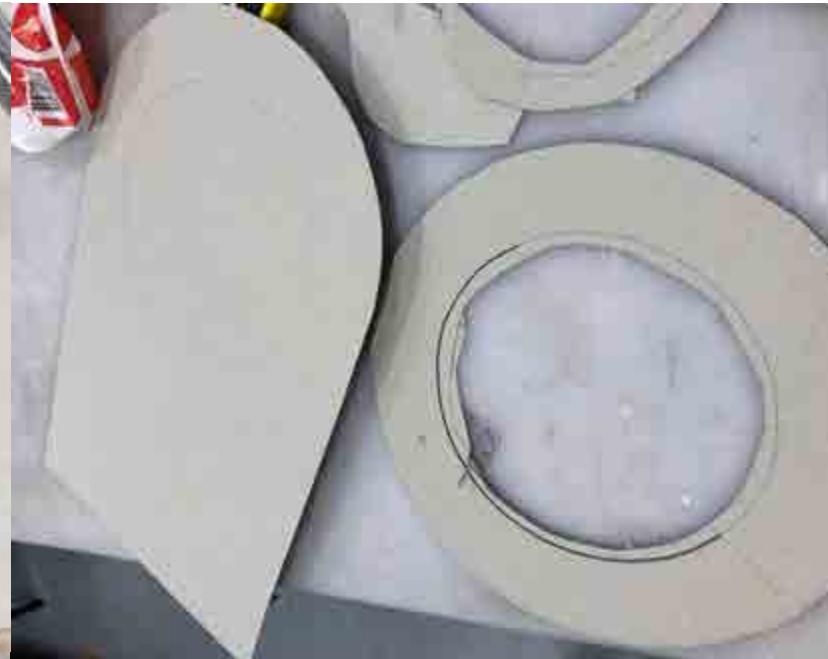
# PROTOTYPING FORMS

DESIGN AND FORMS main body and removable top



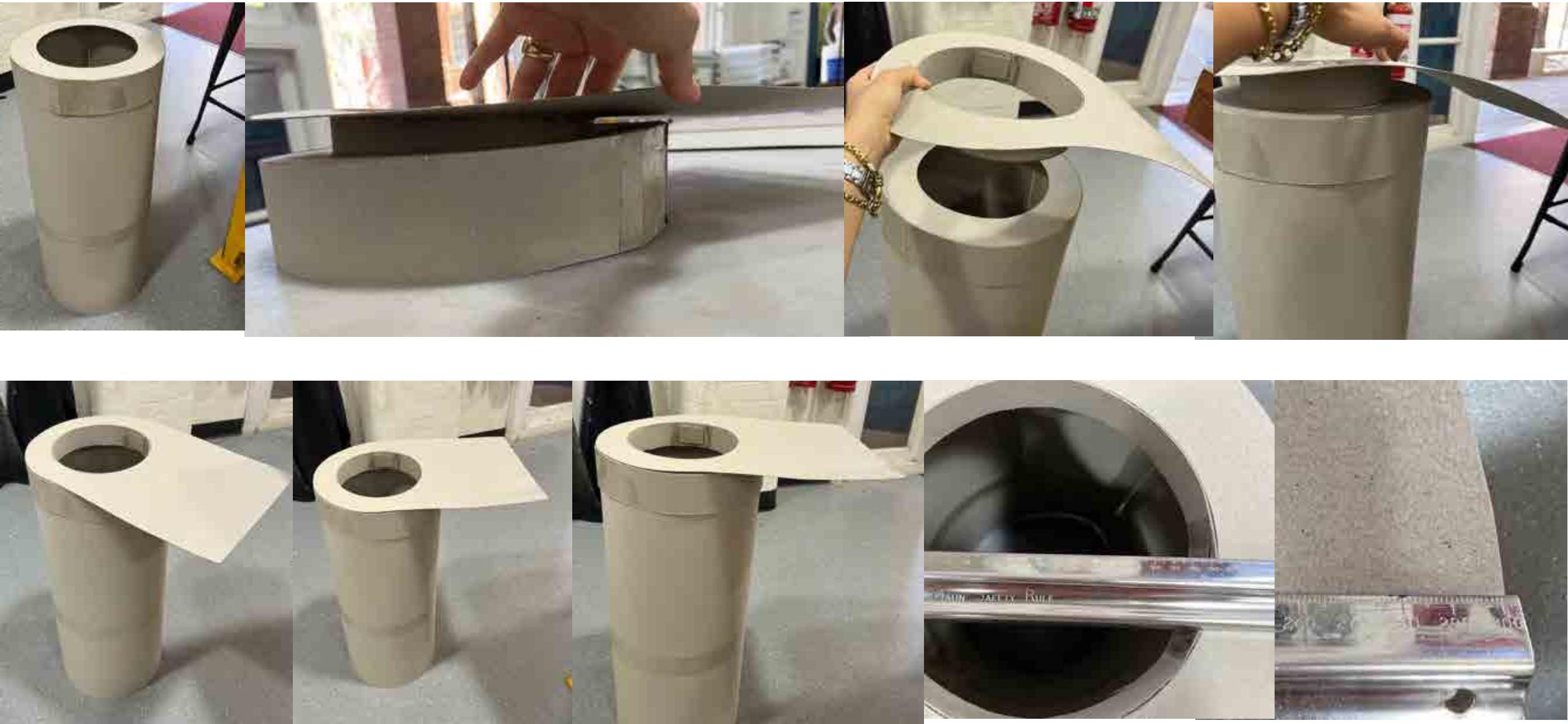
# PROTOTYPING SIZE / VOLUME

Prototype to explore size, parts and assembly



# PROTOTYPING SIZE / VOLUME

Prototype to explore size, parts and assembly

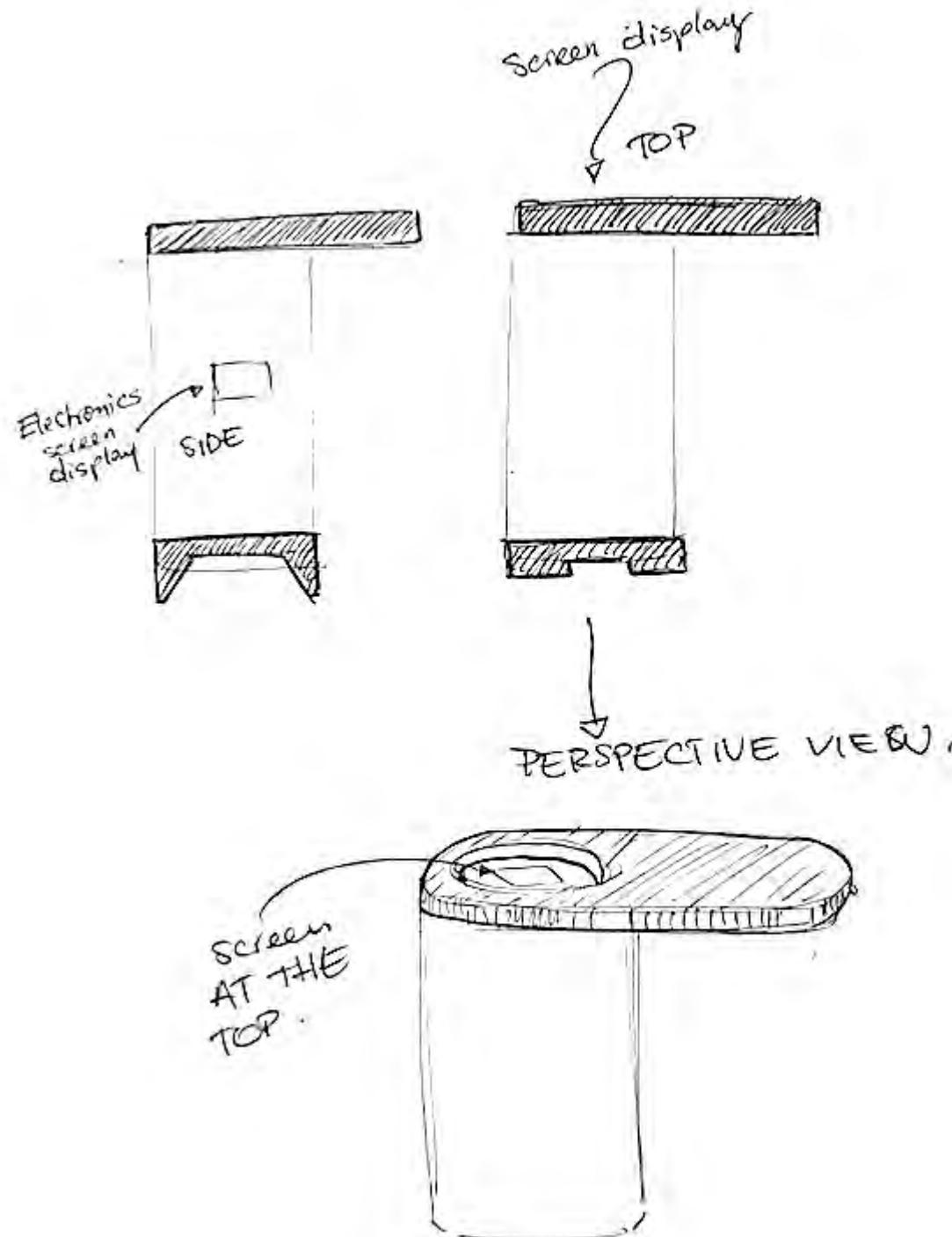


# DESIGN DEVELOPMENT

## SCREEN location and feet design

### TO DO.

- WORK OUT the final aesthetics for the base & lid. Make one of them the most dominant.
- How the power cable will be connected to the parts & electronics.
- Work out the lid & measurements. How the top parts fit together.
- the materials & thickness.
- Waterproof & protect electronics.



### SCREEN DISPLAY:

Changed location from the main body, on the side of the product to now the top of the product so the wood could be used to hide some of the electronics of the product

# DESIGN DEVELOPMENT

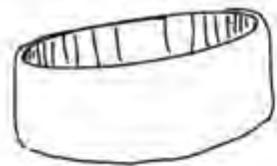
## Part's materials and manufacturing

- TPU material - Injection moulding for gasket (standard/industrial)
- Polycarbonate for main part. (transparent)
- Small runs (casting)
- Large runs (extrusion) → Research (check materials) (injection mo. .5° draft)
- Wooden (Veneer) cover. (find out)

GASKET



- MATERIAL: TPU
- MANUFACTURING P: Injection M



MAIN BODY

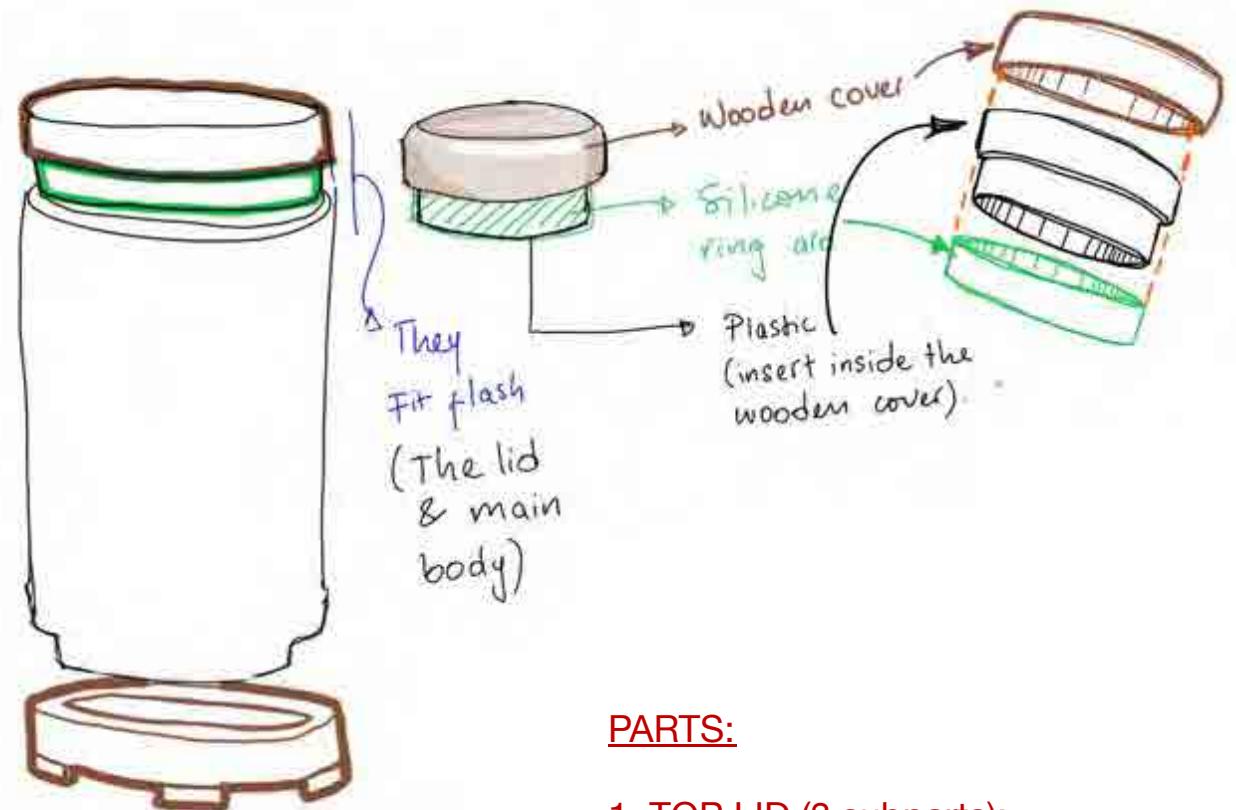


- MATERIAL: Polycarbonate
- MANUFACTURING P: Injection M

Consult with jack tutor:

- Potential materials for parts
- Potential manufacturing processes
- Research and confirm tho.

## Parts design, materials, manufacturing

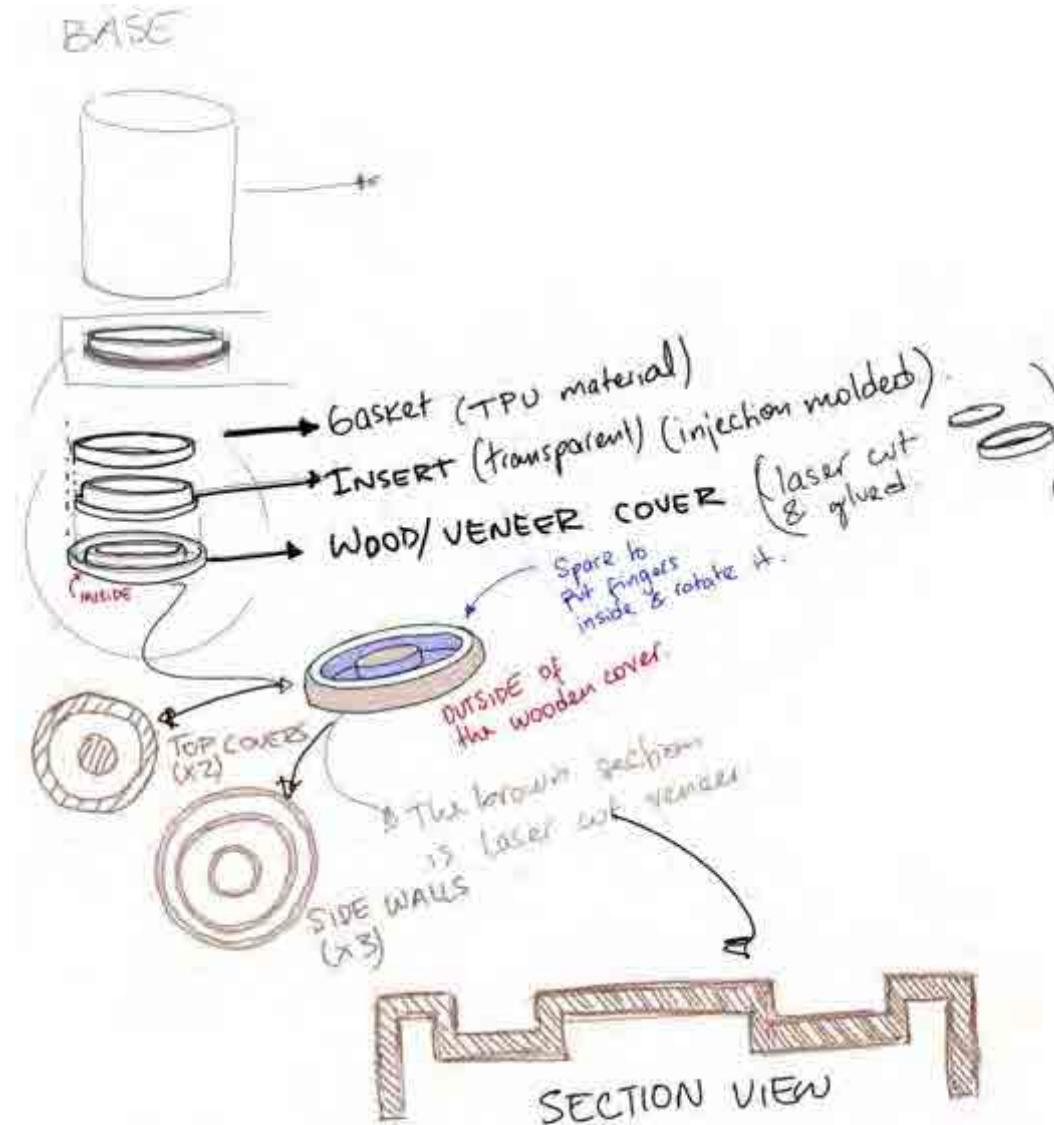


### PARTS:

1. TOP LID (3 subparts):
  - 1.1 Wooden cover
  - 1.2 Plastic insert
  - 1.3 TPU Gasket
2. MAIN BODY (single part)
  - Material: polycarbonate/ acrylic.
  - Manufacturing p: extrusion
3. WOODEN VENEER BASE:
  - Laser cut and glued together

# DESIGN DEVELOPMENT

## Base design



Process for plastics to look like timber...  
(hydrodipping timber)  
↳ this is to treat plastic & make it look like timber

## PARTS Manufacturing Processes and Materials.

-Base cover has a space for grip so it can be easily taken out and back in.

-Base involve 3 parts: cover, insert and gasket.

# RESEARCH ELECTRONICS

## Technology and electronics (GROW LIGHTS)



Grow light 1 - This is the light I built in the first video with one upgrade. I added a 6500k 7020 LED strip to this light to give it a bit more power. The two strips I used can be found here -

Toogod 5050 Grow light strip - <http://amzn.to/1UkHos1>  
 7020 bright white strip - <http://amzn.to/1TGDgQl>

Grow light 2 - This is an all "Cool white light" grow light using 5630 LED strips. I used two of these 5m strips for this light

5630 Cool White LED strip - <http://amzn.to/26Mg62y>

Grow light 3 - This is my old tested CFL grow light it uses 8 cfl bulbs at 6500k/23watts each.

CFL bulbs - <http://amzn.to/1QOm1sn>

Results -

Grow Light 1 - The growth from this light was mediocre at best. Although it was sufficient to keep my seedlings going without any trouble it did not perform better than the CFL light or my sunlight control.

Grow Light 2 - The worst growth of the three lights. This light did not have the power intensity or properly light spectrum to produce good growth. It did keep things rowing and alive but not very well at all.

Grow light 3 - This light performed above and beyond the other two and even had better growth than the plant I placed near the window. I couldn't be happier with my old CFL lights and they have been running strong for over two years.

This was just an initial test to satisfy those who have been asking about them. I am going to build more LED light fixtures with different LED strips and then do a final test to see if I can get better growth from the LED strips for less power consumption and up front cost. If not, it will be back the CFLs!

### Normal lights:

- Color temperature: 6500K
- Lumens: how much it gives off (must be over 500 lumens)



### Grow lights:

- Color temperature: 6400K
- Watts: 24
- Lumens: how much it gives off (must be over 500 lumens)

# ELECTRONICS LIGHTING

Technology and electronics (GROW LIGHTS)

**24 V IP20**

**Flexible LED Strip Light | COB CCT (Dual Warm & Cool White) | 24W/m 24V 2400-6500°K IP20**

**COB / CCT**

- 24 WATTS
- 24 VOLTAGE
- 2700K-6500K COLOUR
- 1584 LUMENS
- IP20 INDOOR
- 5m LENGTH
- COB LED CHIP
- 608 LED/m
- 26mm CUTTABLE
- 10mm TAPE WIDTH
- 90+ CRI

Brand:

**IP20**

**Flexible LED Strip Light | RGB COB | 15W/m 24V IP20**

**RGB**

- 15 WATTS
- 24 VOLTAGE
- RGB COLOUR
- LUMENS
- IP20 INDOOR
- 5m LENGTH
- COB LED CHIP
- 840 CHIPS/m
- 25mm CUTTABLE
- 10mm TAPE WIDTH
- CRI

COB flexible strip light offers a seamless visual linear light, eliminating any visual dots often found with traditional strip light. Ideal for installations where the LED strip will not be mounted within profile but seen.

## PARTS:

- OPTION A:**
  - Higher kelvin
  - Continues light/glow
- MAIN BODY (single part)**
  - Material: polycarbonate/ acrylic.
  - Manufacturing p: extrusion
- WOODEN VENEER BASE:**
  - Laser cut and glued together

**LINEAR LUX**

Contact us by phone, e-mail or visit

13 Jayne St Sainsbury Q. 4107  
Mon - Fri 9:30am - 4:30pm

mail@linearlux.com.au  
Call 1800 222 222

SOURCE:  
<https://linearlux.com.au/product/flexible-led-strip-light-cob-cct-dual-warm-cool-white-19-2w-m-24v-2400-6500ok-ip20/>

**COLOURS**

2400°K 2700°K 3000°K 4000°K 6000°K 6500°K

RED GREEN BLUE ORANGE YELLOW PURPLE PINK

RGB RGB+CCT

**IP PROTECTION RATINGS**

IP20 INDOOR IP54/65 SPLASHPROOF IP67 WATERPROOF

— FPCB  
 — Silicone Gel  
 — Double-sided tape 3M 9080 (indoor)  
 — Double-sided tape 3M 300LSE (outdoor)

6500K and up: gives off a bright bluish hue of light, often found in commercial locations; best for bright task lighting

# MANUFACTURING HYDRO DIPPING

HYDRO DIPPING plastic parts (LID material)



YouTube  
HOW TO HYDRO DIP USING SPRAY PAINT

YouTube  
Hydro Dipping water transfer woodgrain steering wheel  
Uploaded by: JOHNNY RAY, 11 Jul 2015



## REASONING:

- 1.(COST) Parts can be injection molded as opposed of machined wood which is more expensive.
- 2.Process: After parts are injection molded, they will then be hydro dipped.
- 3.(DURABILITY) The thinner areas of the parts will be stronger if done in plastic as opposed of timber. When thin, timber is more brittle, less strong than plastic..
- 4.Plastic is water resistant.
5. (SHAPES) More intricate shapes can be achieved to assist in holding/housing electronics.

## NEAGTIVE:

The wooden finish might no look very realistic which might make the product be perceived as cheap.

# MATERIALS MAIN BODY

Material (Main body - cylinder) for final prototype



## Clear Acrylic Tube

\$8.98 - \$2,117.50 (plus GST and delivery)

Our clear acrylic tube delivers brilliant quality and superior performance and durability. They offer excellent light transmission, high surface hardness and are weather resistant, making them excellent for interior and exterior lighting, contemporary furniture, brand merchandising and store fixtures, plinths or decorative architectural features.

Dispatched in 3-5 working days

### Diameter

250mm OD x 240mm ID

\$529.38 Per Linear Metre

Required Length (min 100 mm / max 2000mm) (mm)

### Product Price

#### Typical applications:

- Signage
- Plinths
- Models
- Displays
- Crafts and DIY
- Interior design
- Event and food design
- Staircase banister
- Lighting design

Clear acrylic tube comes in lengths of 2000mm and you can purchase full lengths or we can cut it to size for you.

#### Weather resistant

Extruded acrylic tube achieves high resistance to the elements making it suitable for both indoor and outdoor applications.

#### Recyclable

Clear acrylic tube can be fully recycled back to its original monomer. For further information on recycling please click here.

#### Description

##### Clear Acrylic Tube

Our clear acrylic tube delivers brilliant quality and superior performance and durability. They offer excellent light transmission, high surface hardness and are weather resistant, making them excellent for interior and exterior lighting, contemporary furniture, brand merchandising and store fixtures, plinths or decorative architectural features.

Clear acrylic tubes on this page are available with wall thicknesses of 1mm, 2mm, 3mm, 4mm and 5mm - the sizes listed show an OD and ID Full lengths come as 2000mm.

#### Notes:

- The OD is the Outside Diameter of the acrylic tube in mm
- The ID is the Inside Diameter of the acrylic tube in mm

#### Key features:

- Rigid
- Hollow
- Clear
- Inexpensive
- High impact strength
- Wide range of different diameters
- Numerous wall thicknesses
- Lightweight

Extruded acrylic tubes are available in 1m or 2m lengths, while strictly only 2m lengths will be sold in diameters above 180mm. Some light extrusion lines may be visible in larger diameters above 90mm. Standard wall thickness is 3mm for tubes in small diameter and 2mm or 3mm for all other sizes. Some tubes in transparent colour are available in diameter of 20mm or 30mm.

Acrylic tubes can be custom cut to almost any length however shorter lengths cuts may not be possible due to safety standards. As standard tubes have saw cut edges, polished edges are optional and charges will apply. When shipped tubes are protected by a layer of clear film together with bubble wrap and fragile labels. Please note that 2m length tubes and over will incur an oversize shipping charge.

We can supply colour and clear tubes in larger diameters not listed as standard. Please contact us for more details. [sales@acrylicsonline.com.au](mailto:sales@acrylicsonline.com.au)

Product dimensions are displayed as outside diameter (OD) and inside diameter (ID)

Extruded acrylic tube provides an economical alternative to cast acrylic and is ideal for reinforcing and decoration. It is commonly used for point of sale and jewellery display, fish tanks, wedding decoration and lighting accessories.

#### Key Features:

- Economical alternative to cast acrylic tube
- 10 times the impact resistance of standard glass
- Easily fabricated, cut, drilled, and polished
- Manufacturing tolerances
- Excellent optical properties
- Fully recyclable
- Lightweight material
- Outstanding UV and weather resistance
- Temperature range: Up to +75°C, +90°C short term
- Very good resistance to weak acids and alkalis
- Suitable for glue adhesion.

## EXTRUDED CLEAR ACRYLIC TUBE 250MM

Presented by Acrylics Online (Pty) Ltd. Acrylics Online is a leading supplier of acrylic products in Australia. We supply a wide range of acrylic products for your business and home.

### TECHNICAL DETAILS:



### ADDITIONAL INFORMATION

### ORDER OPTIONS:

#### DIMENSION

OD: 250mm / ID: 244mm

#### LENGTH

2m

SOURCE:

<https://www.acrylicsonline.com.au/products/extruded-clear-acrylic-tube-250mm>

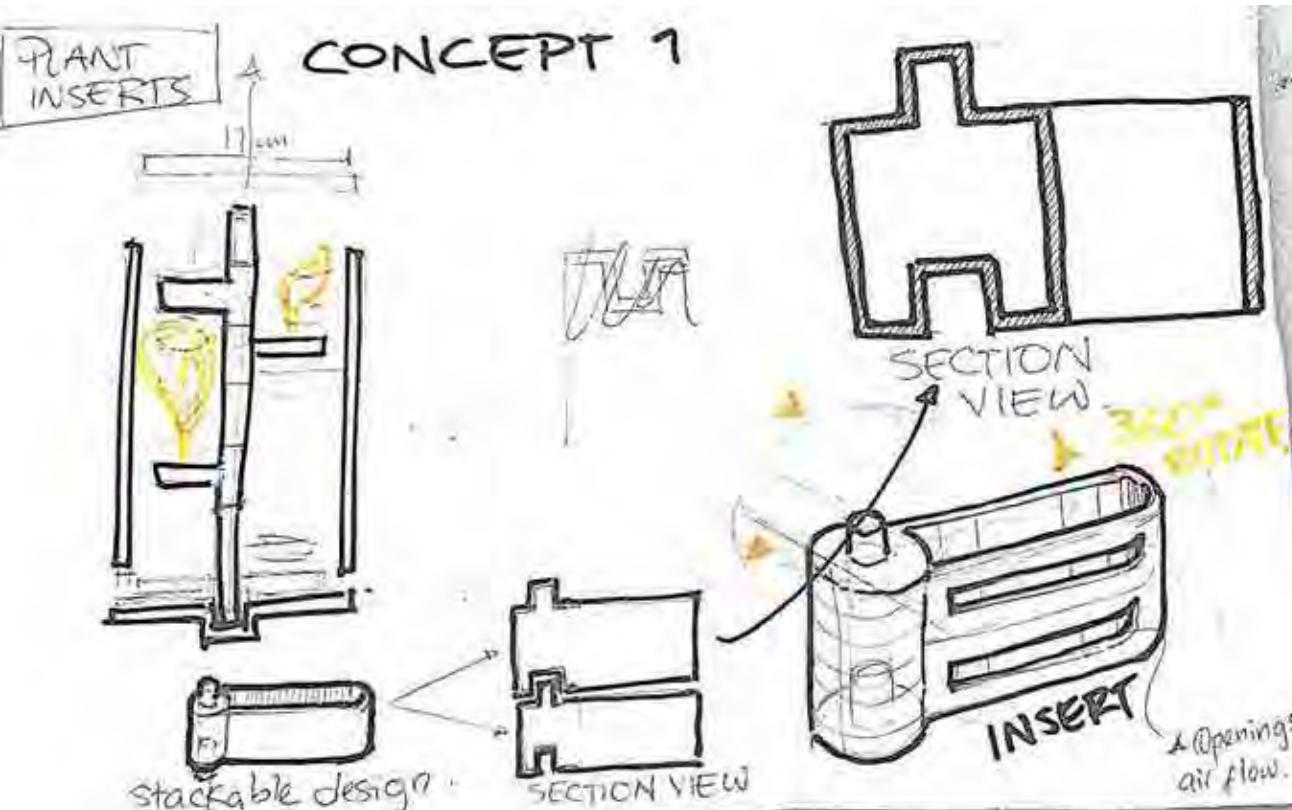
<https://www.kfplastics.com.au/clear-acrylic-tube>

## MAIN BODY - MATERIAL:

1. Comes in the actual diameter and length
3. Seethrough

# DESIGN DEVELOPMENT

Inserts design (houses plant cuttings)

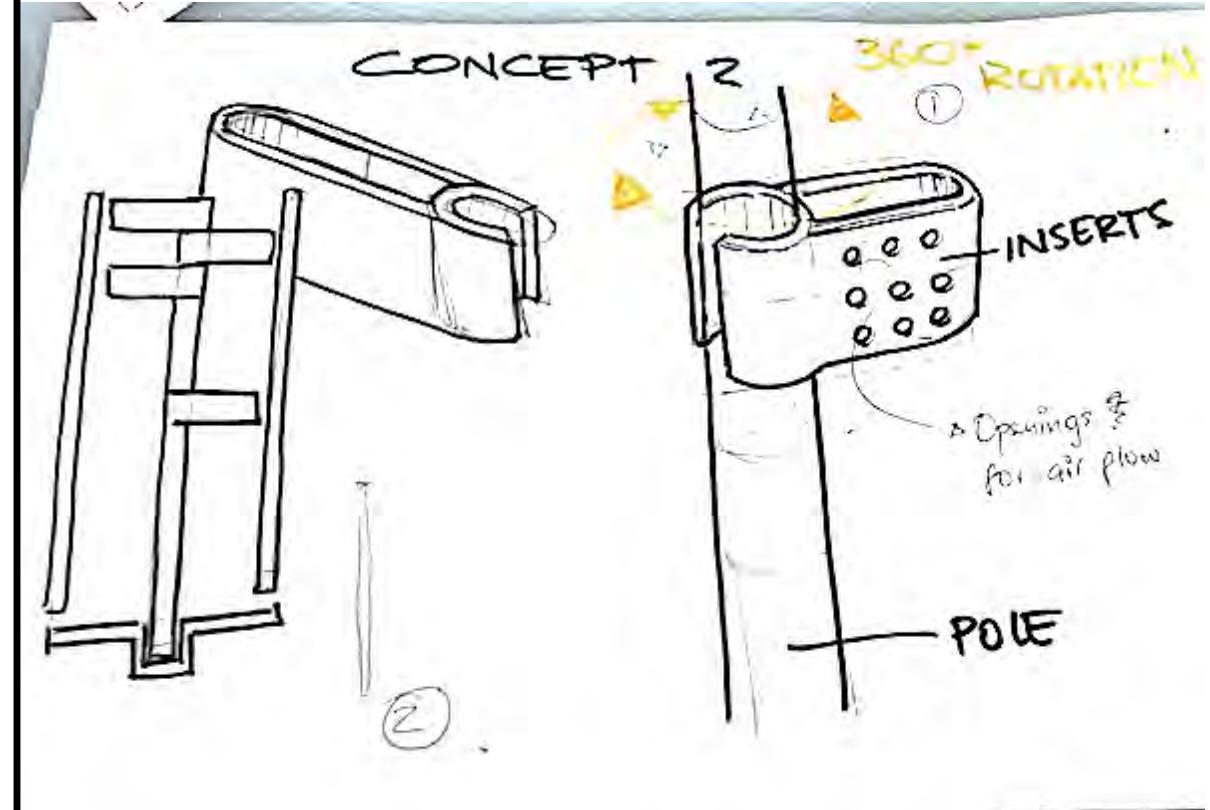


## CENTRE STACKABLE DESIGN:

**NEGATIVE** – because all the inserts are stacked into one part, to access any of them, they must be unstacked first. Time consuming.

**POSITIVE** – stackable design means easily attached and detached parts and low amount of parts.

Inserts design (houses plant cuttings)



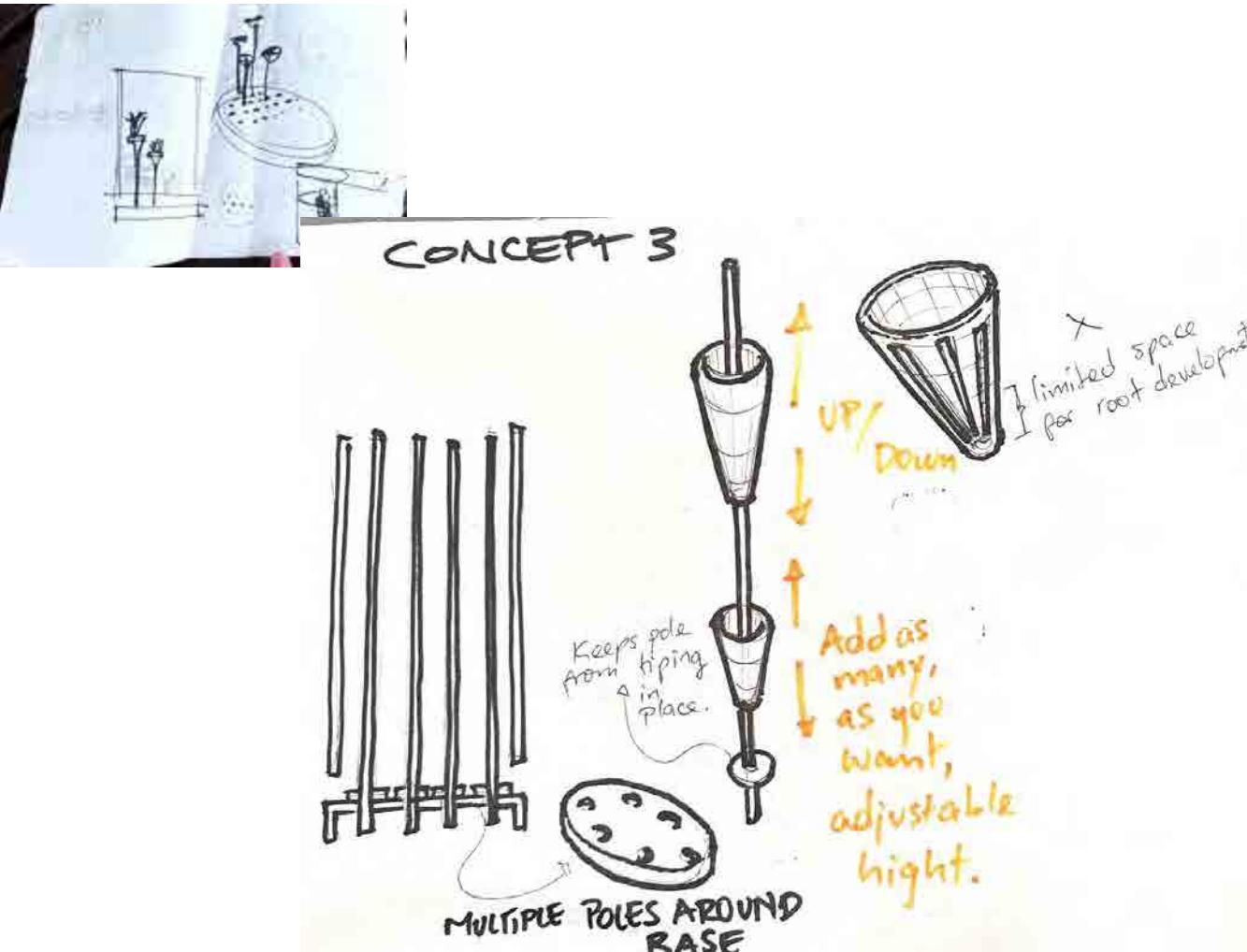
## CENTER POLE AND INSERTS:

**POSITIVE** - Inserts attached easily to pole, can be moved sideways and up and down and only the needed inserts can be used (depending on the number of cuttings).

**NEGATIVE** - If all inserts are used in the pole and user needs to access the bottom insert, the pole needs to be taken out.

# DESIGN DEVELOPMENT

Inserts design (houses plant cuttings)

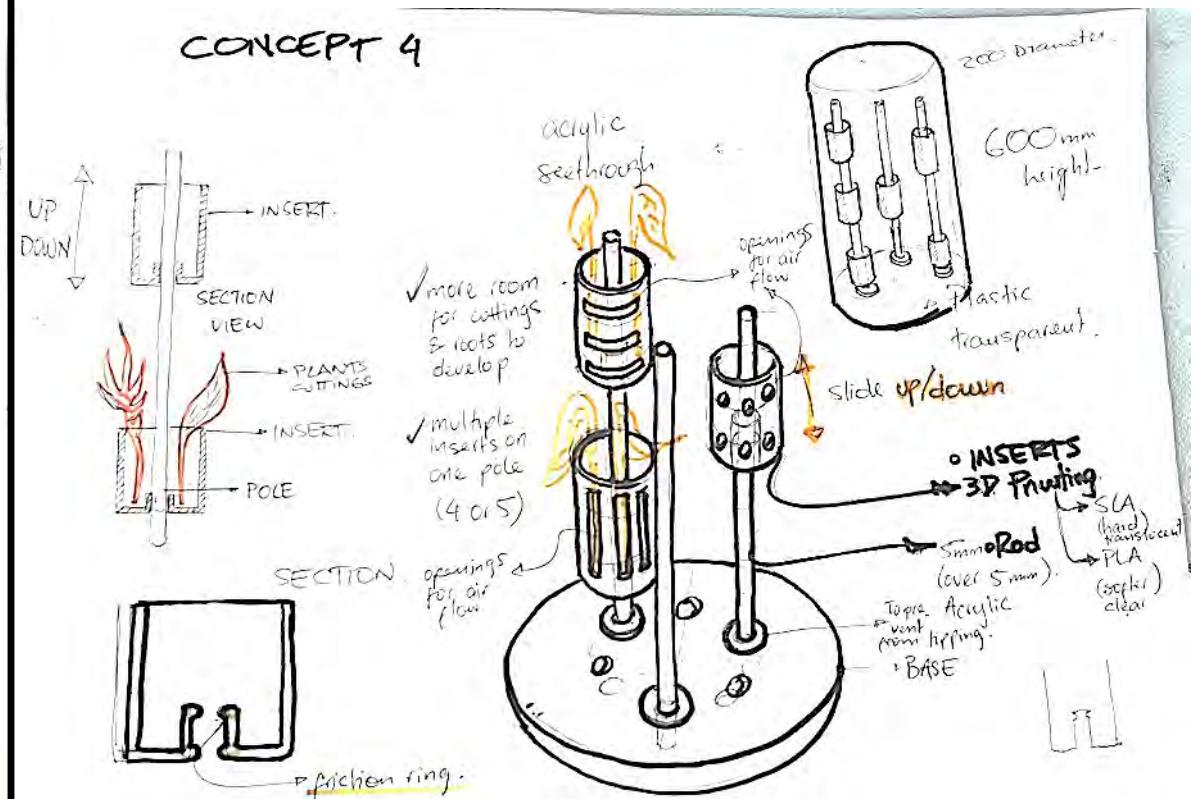


## MULTIPLE POLES AND CONE INSERTS:

**POSITIVE** - Having more than one pole allows the person when accessing an insert to pull the pole where their insert is, which saves time. Unlike one pole that has all the inserts and would take more time if accessing the ones at the bottom.

**NEGATIVE** – There is not much room for root development due to the narrow bottom of the cone insert.

Inserts design (houses plant cuttings)



## MULTIPLE POLES AND CYLINDER INSERTS:

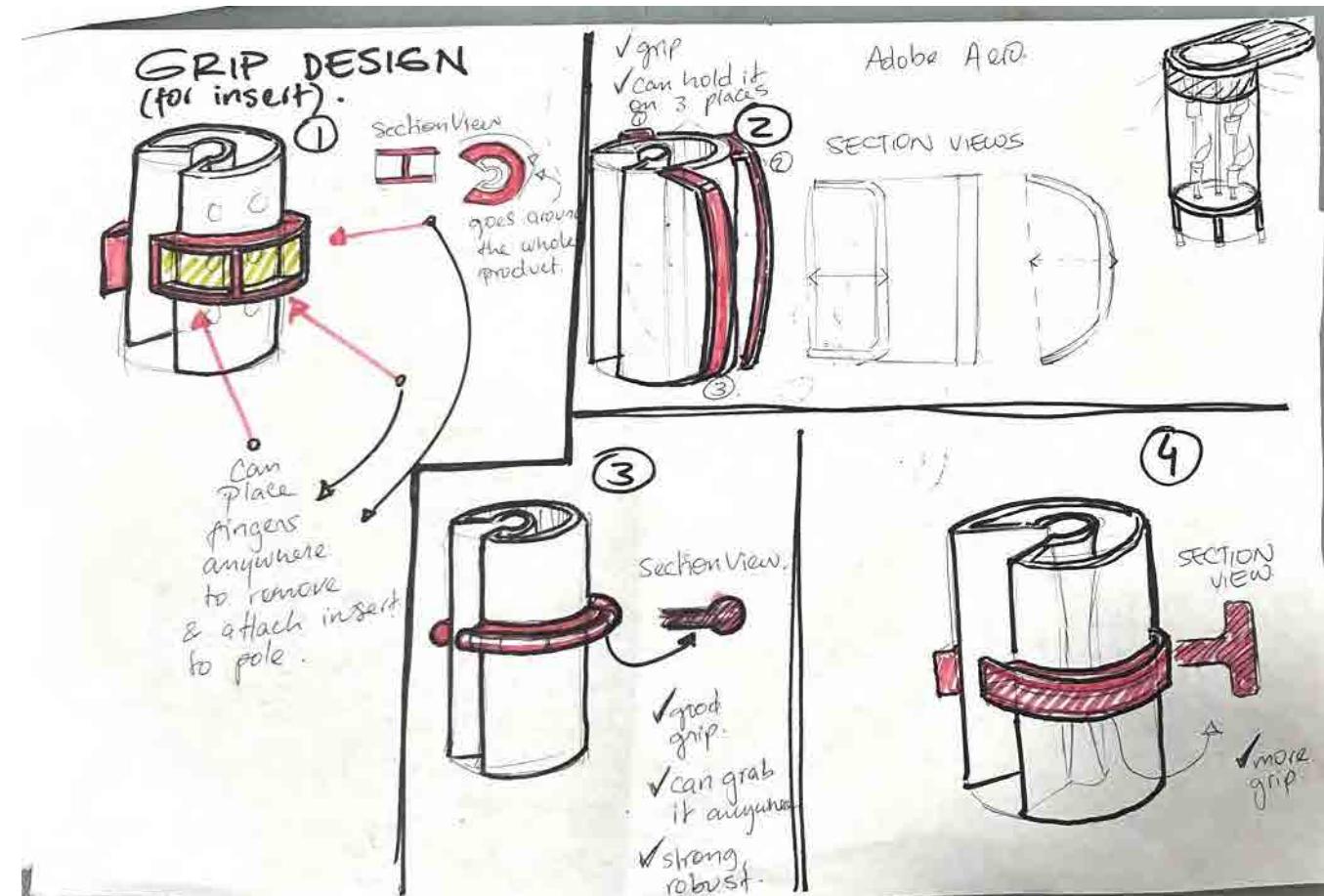
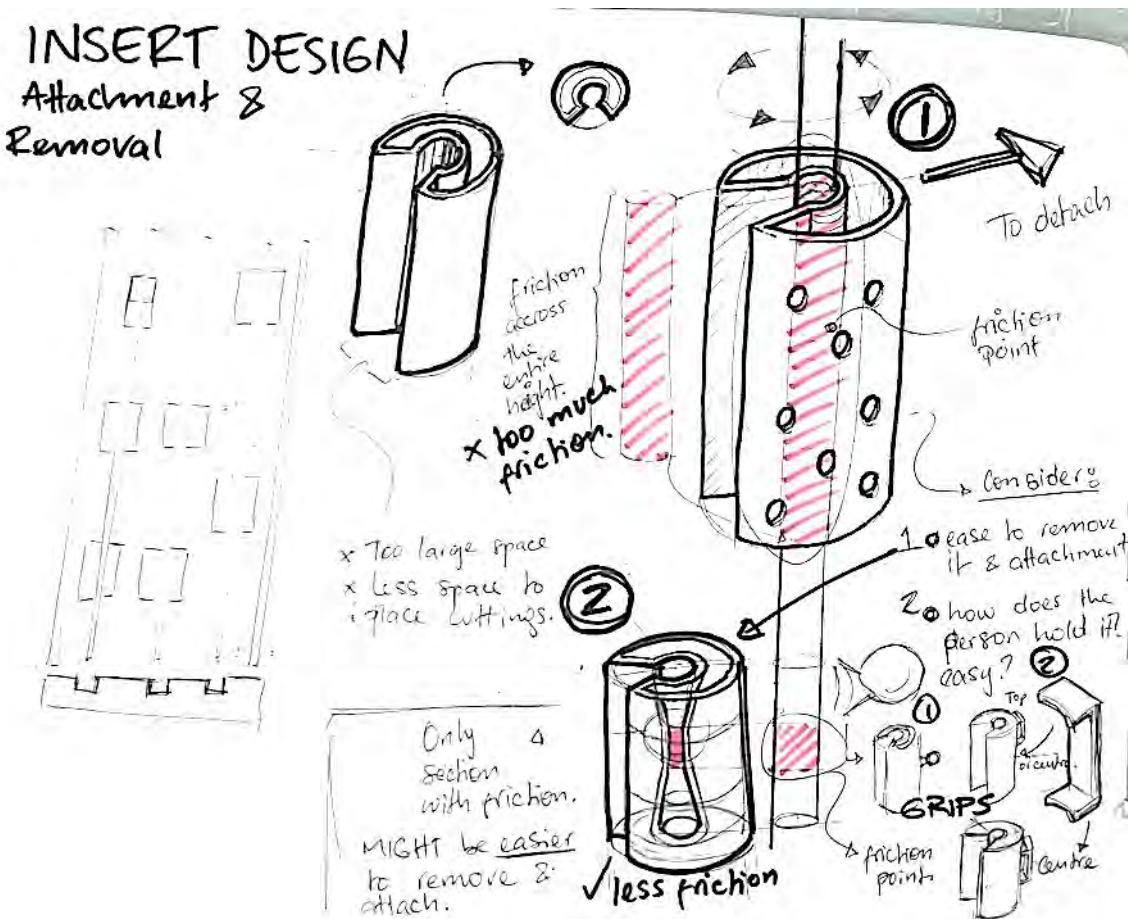
**POSITIVE** - Unlike the cone shape with a narrow bottom, the cylinder inserts offer more space at the bottom of the insert for root development.

**NEGATIVE** – to take bottom inserts, the top ones have to be removed first.

**FIND OUT** – need to think how the poles can be placed inside the cylinder without much difficulty

# DESIGN DEVELOPMENT

Inserts design (houses plant cuttings)



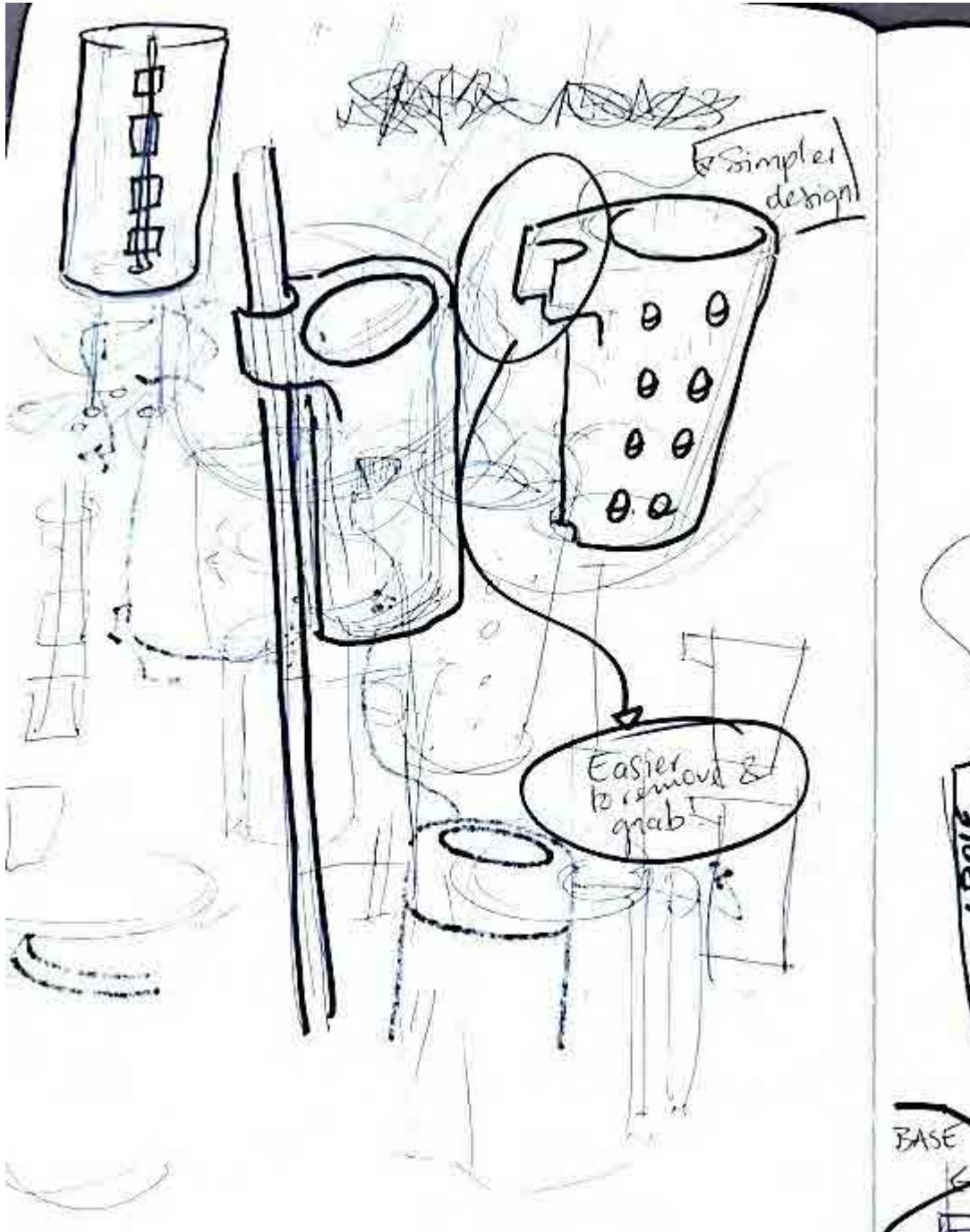
**INSERT DESIGN (attachment and grip):**

**POSITIVE** – All designs provide a good grip for easy attachment and removal (right image).

**NEGATIVE** – Inserts design aesthetics is now more complex and busier. This part will be seen through the main body so it should be aesthetically pleasing and in harmony with the rest of the design. Must be simplified more.

# DESIGN DEVELOPMENT

Inserts design (houses plant cuttings)



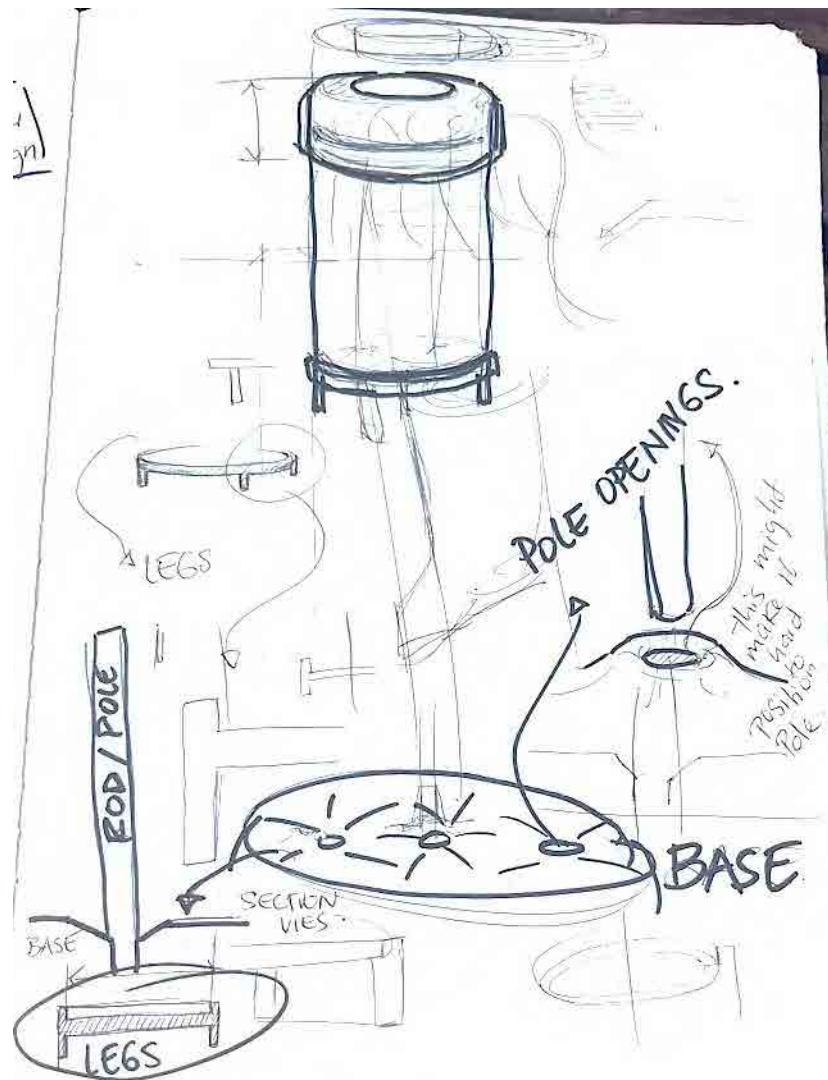
INSERT DESIGN (attachment and grip):

**POSITIVE** –Attachment only occurs at the top which means less friction and easier removal and attachment. Person can hold the bottom and pull to detach product from poll and to attach it back to the poll

**RESOLVE** –make design to sit straight and not in an angle, determine right dimensions and attachment area, decide what plastic is transparent and flexes to chose for this part.

# DESIGN DEVELOPMENT

Base design for pole ease of placement

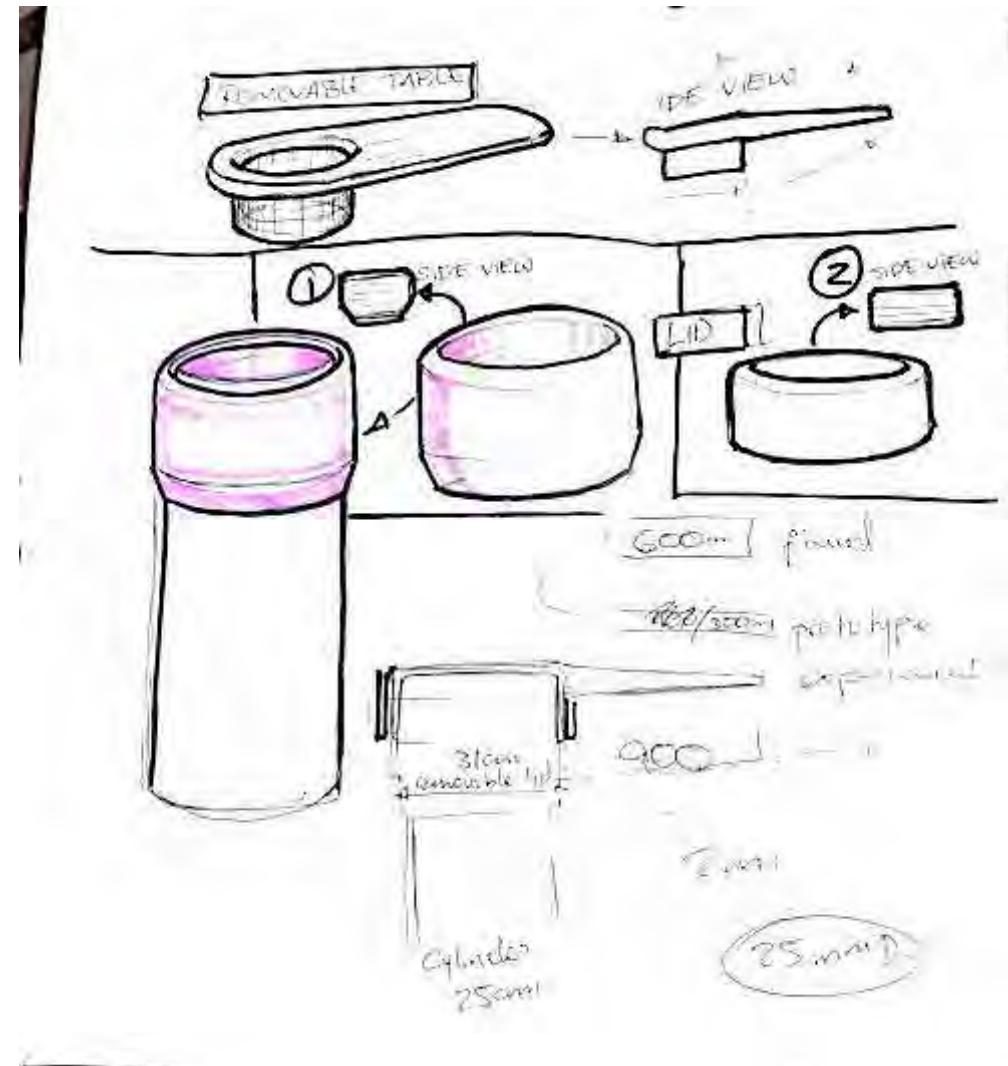


## INSERT DESIGN (attachment and grip):

-The base will have to have openings for the poles to go through and keep them upright. Openings might also be needed in the lid, so it further helps keeping the poles upright.

-To facilitate placing the poles specially with plants in where there is limited visibility incorporate a self alignment system, so the user doesn't need to be precise when finding the hole to place the pole, but it self-directs it

Lid and removable table design



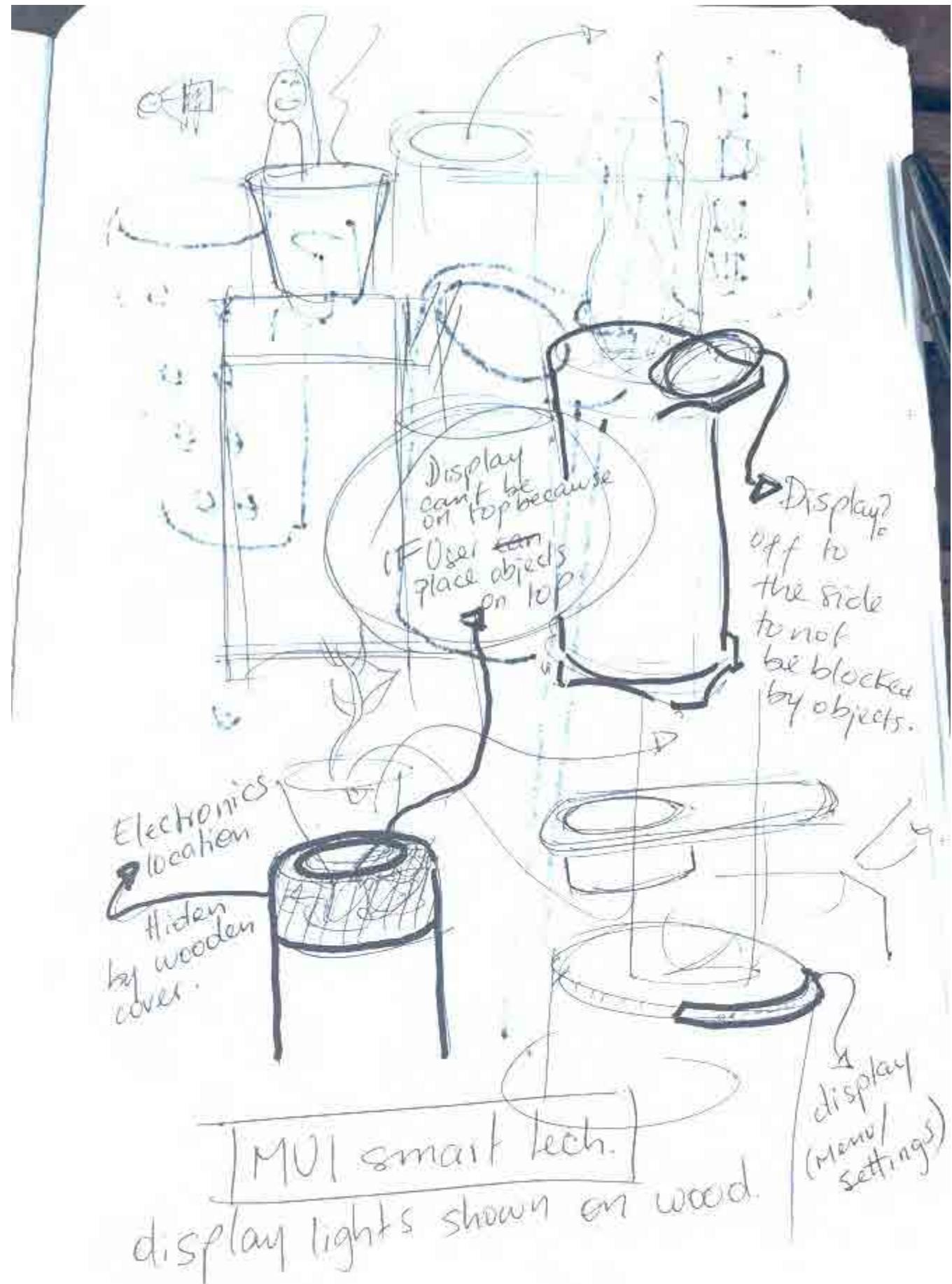
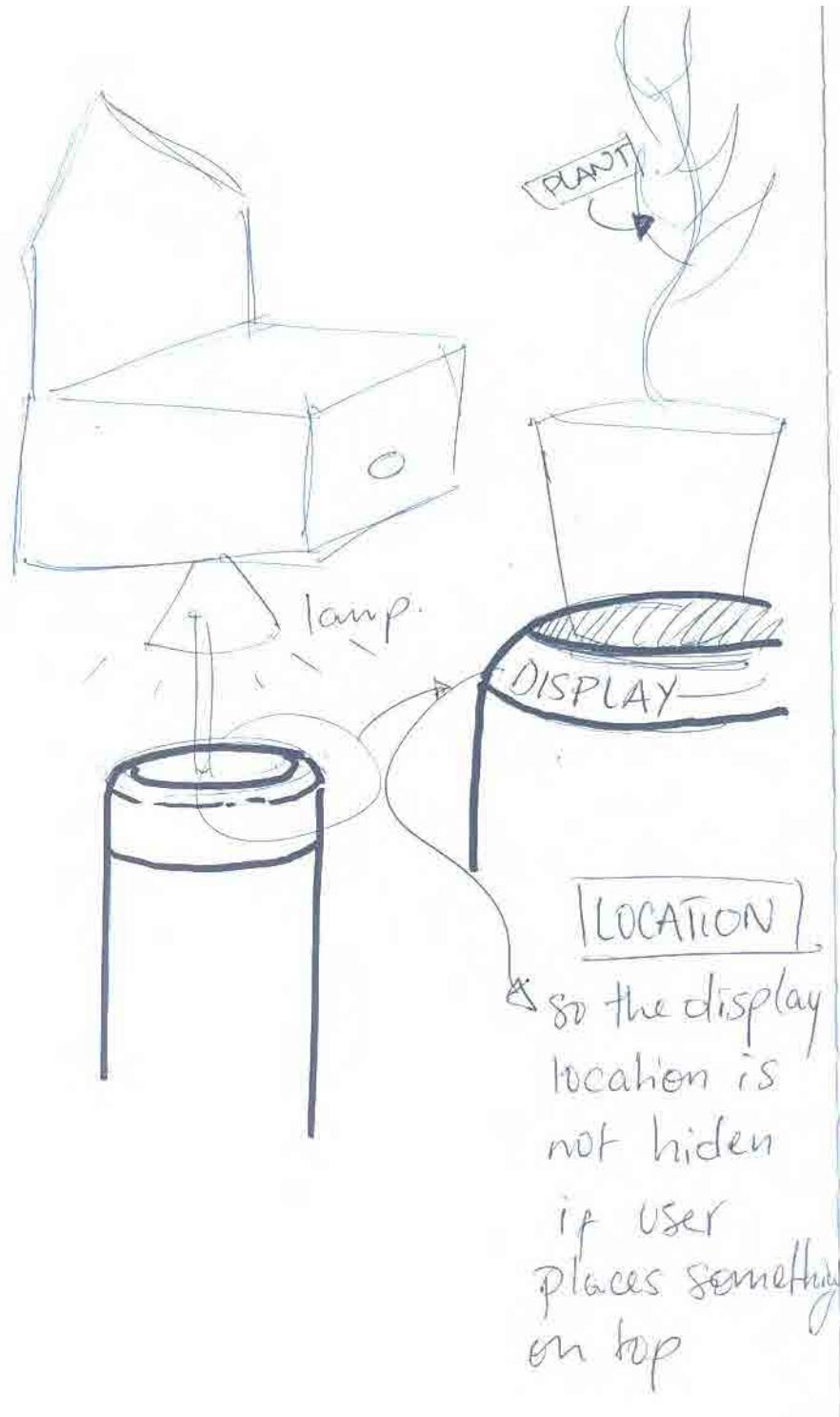
-How parts may fit with each other. Needs to be further resolved (with electronics and lid and how it fits the main body)

-Decided to **not include the removable top** to simplify product and because the top lid also serves as a table to place items.

-Top lid (in pink) bottom edge might have to come in at an angle or if not align it to the feet, so both the feet and the lid come out from the main body the same distance (same width).

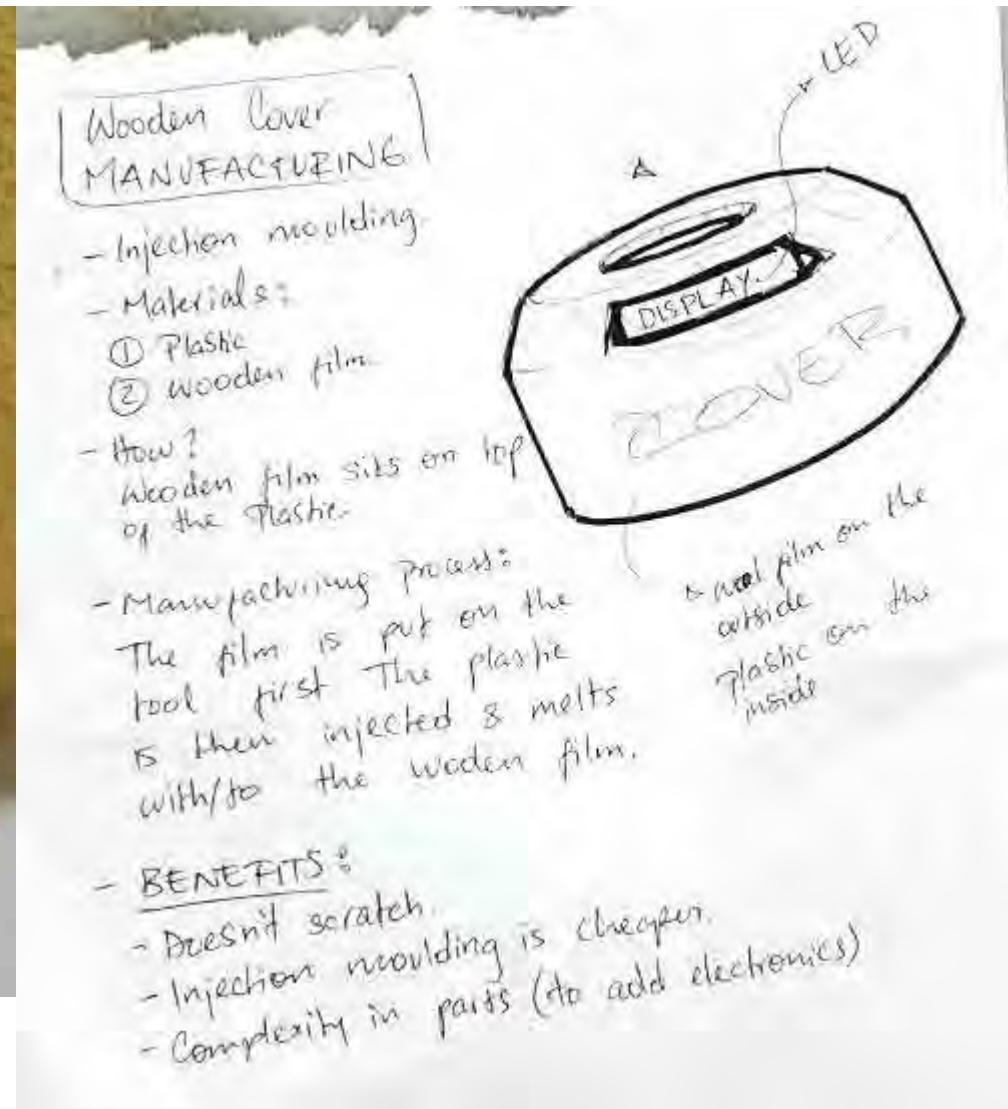
# DESIGN DEVELOPMENT

Display (menu/setting) design and location



# DESIGN DEVELOPMENT

## MANUFACTURING AND MATERIAL (for top parts)



**PART:** WOODEN COVER

**MANUFACTURING PROCESS:** injection molding

**MATERIALS:** plastic and wooden film

**MANUFACTURE PROCESS/MATERIAL BENEFITS:** does not scratch, cost effective specially for a large part when compare with solid wood carving and machining and stronger and more durable part.

# DESIGN DEVELOPMENT

DISPLAY (LED display panel behind wood and elastic displays)



### Flexible LED Display

- Application: Cinema Theatre, Branded shops, Airports etc
- Pixel pitch starting from 2.5mm
- Bend angle: 180 Degrees.
- Front Maintenance
- Flexible silicone / Rubberframe material

Sources:

<https://theawesomer.com/mui-wood-touch-panel/508728/>

[https://www.aliexpress.com/item/1005002220503523.html?spm=a2g0o.productlist.0.0.ce69441c3qLqbn&algo\\_pvid=2bc2e44e-abc5-44a5-ad61-5a33f96114fd&aem\\_p4p\\_detail=20211025185625100143028016040044867733&algo\\_exp\\_id=2bc2e44e-abc5-44a5-ad61-5a33f96114fd-9&pdp\\_ext](https://www.aliexpress.com/item/1005002220503523.html?spm=a2g0o.productlist.0.0.ce69441c3qLqbn&algo_pvid=2bc2e44e-abc5-44a5-ad61-5a33f96114fd&aem_p4p_detail=20211025185625100143028016040044867733&algo_exp_id=2bc2e44e-abc5-44a5-ad61-5a33f96114fd-9&pdp_ext)

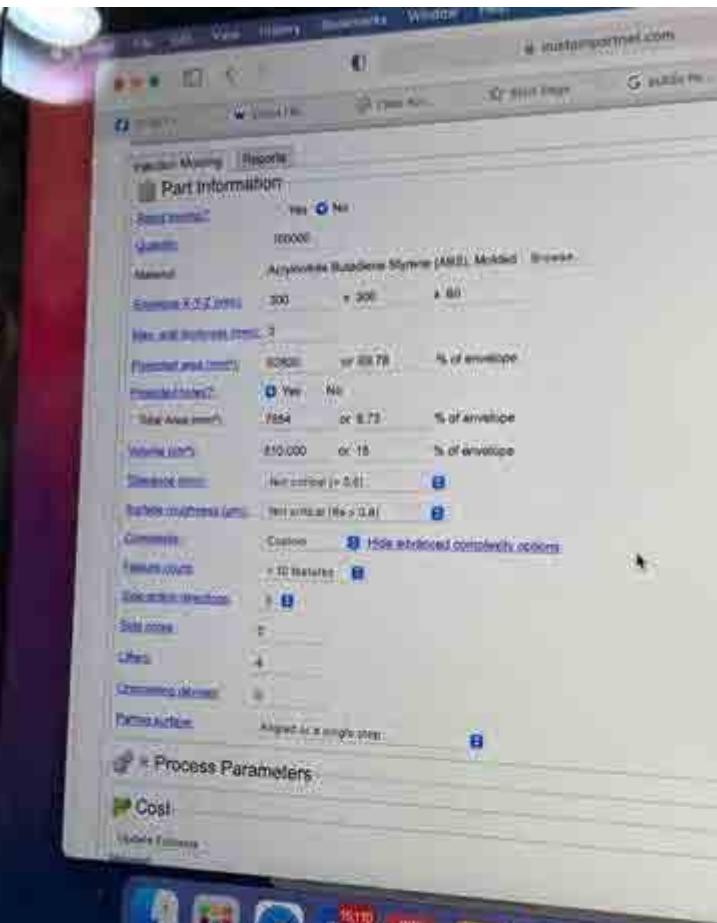
INSERT DESIGN (attachment and grip):

**-FLEXIBLE SCREEN (top right)** is needed because the screen is located in a curved area on the product and can't be placed on the flat surface as it is used to place objects

**-Display placed under a transparent plastic part with a wooden film** to look like the image on top left.

# DESIGN DEVELOPMENT

MANUFACTURING Cost estimate –wooden cover lid (Material, production, tooling, cavities)



Surface roughness (µm): Not critical (Ra > 0.8)

Complexity: Custom [Hide advanced complexity options](#)

Feature count: < 10 features

Side-action directions: 0

Side cores: 0

Lifters: 4

Unscrewing devices: 0

Parting surface: Angled or a single step

**Process Parameters**

**Cost**

Update Estimate

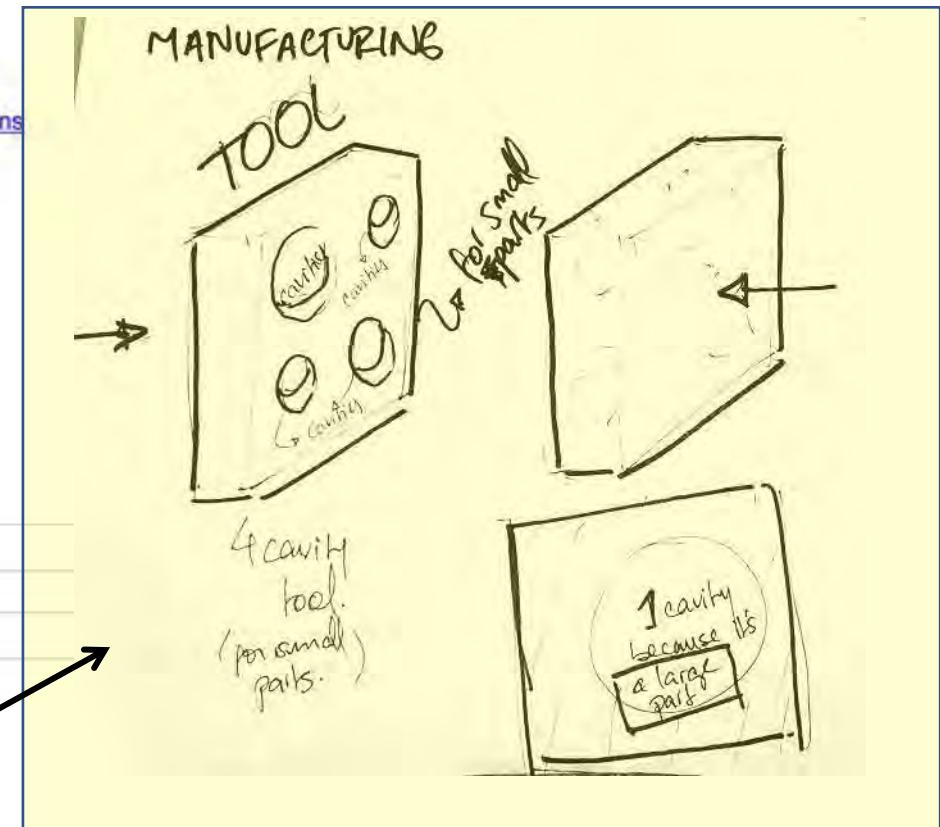
Material: \$302,824 (\$3.028 per part)

Production: \$55,745 (\$0.557 per part)

Tooling: \$61,436 (\$0.614 per part)

Total: **\$420,005 (\$4.200 per part)**

[Feedback/Report a bug](#)



MANUFACTURING info:

- CAVITIES:** Wooden cover is a large part, so it is cheaper to have a single cavity in the tooling.
- CAVITIES:** It is cheaper to have multiple cavities tooling when the parts are small
- UNDERCUTS CHEAPER THAN EXTRA LABOUR:** It is more effective in the long run to add under cuts as it minimizes assembly time and costs as it reduces need for labor.

Sources:

<https://www.custompartnet.com/estimate/injection-molding/?units=1>

**Cost Estimator**

New Estimate Save Share Units

Injection Molding Reports Additional Processes

Cavity Analysis

Injection Molding	1 cavity	2 cavities	4 cavities	8 cavities
Material purchase weight (kg)	93,920.35	93,920.35	93,920.35	93,920.35
Material price (\$/kg)	2.58	2.58	2.58	2.58
Machine clamp force (kN)	4,893	8,318	17,998	39,002
Production rate (parts/hr)	140	265	507	914
Hourly rate (\$/hr)	70	100	185	375
SPI mold class	Class 103	Class 104	Class 104	Class 104
Material cost	\$302,824 (\$3.028)	\$302,824 (\$3.028)	\$302,824 (\$3.028)	\$302,824 (\$3.028)
Production cost	\$55,745 (\$0.557)	\$42,390 (\$0.424)	\$41,768 (\$0.418)	\$48,429 (\$0.484)
Tooling cost	\$61,436 (\$0.614)	\$99,179 (\$0.992)	\$163,888 (\$1.639)	\$272,278 (\$2.723)
<b>Total cost</b>	<b>\$420,005 (\$4.200)</b>	<b>\$444,392 (\$4.444)</b>	<b>\$508,480 (\$5.085)</b>	<b>\$623,531 (\$6.235)</b>

Save All

# MANUFACTURING RESEARCH

Injection Moulding (undercuts, securing electronics, sliding cores)



-**Undercuts**: when done to secure electronics or to join parts, it results more cost effective than not having them, and having more parts or fasteners (screws) instead. This increases costs in assembly (labor costs).

-**Words and information** can be machined in the tooling to show it in the product (brand name, logo, type of plastic etc)

-**Texture** can be machined in the tooling to have texture in the part.

# DESIGN DEVELOPMENT

## MARKET RESEARCH (Waterproof electronic housings)



**Sonoff IP66 Waterproof Junction Box Waterproof Case Water-resistant Shell Compatible With Basic/Dual/Pow/RF/G1 Smart Switches**

**Product Specification:**

Specification for IP66 Waterproof Case

- Waterproof Level: IP66
- Body Material: ABS V0
- Transparent Cover Material: PC V0
- Dimensions: 132.2\*68.7\*50.1mm(L\*W\*H)
- Weight: 145.0g

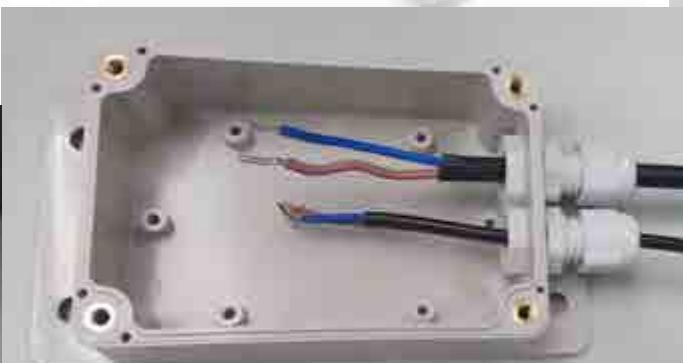
**Product Overview:**

Sonoff IP66 is a high-quality waterproof case that can be used with Sonoff Basic/RF or the PCBA board of Sonoff Pow/TH10/TH16/G1 in the underwater environment. The waterproof level of the waterproof box is IP66. It allows you to remote control your lights or home appliances outdoor. Just get it to control your Christmas tree lightings!

**Package Includes:**

- 1 x Sonoff IP66 Waterproof Junction Box
- 2x screws

Sonoff Tech Store  
Product Store



Connect the Sonoff Basic accordingly. Connect it to your power supply and the Christmas tree LED



### How to Install



Place the switch into the housing and connect wires



Mount it onto the wall with screws



Fasten the wiring nuts with wrench until secure

### WATERPROOF/ WATER RESISTANT ELECTRONIC HOUSINGS:

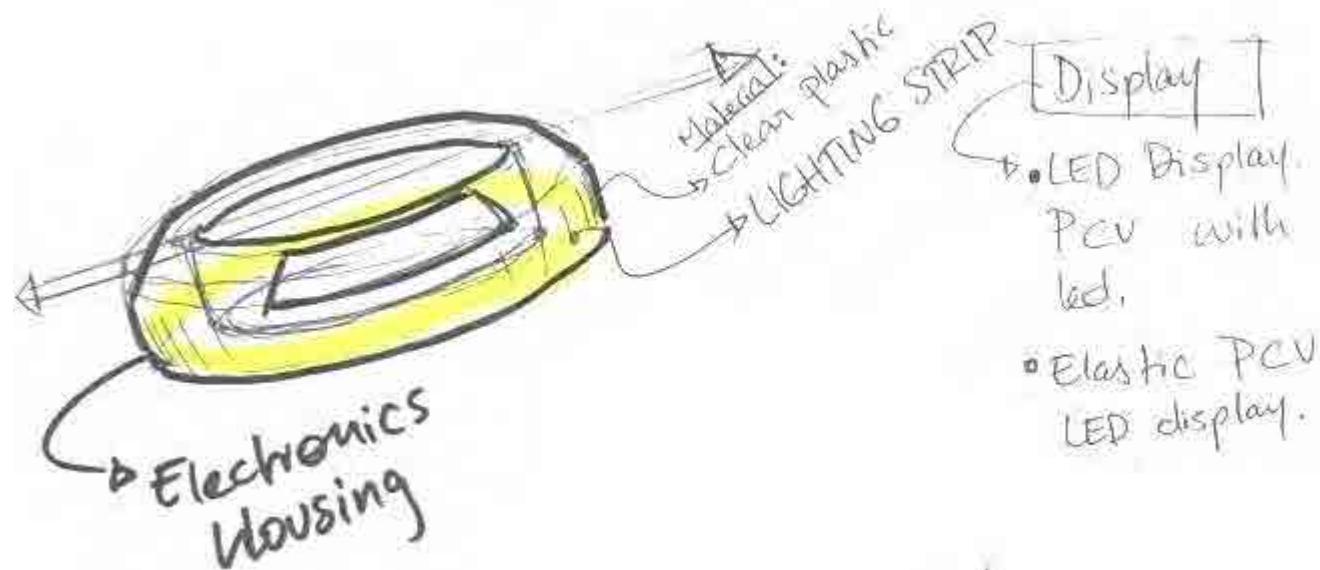
- Common material used: ABS
- Transparent color specially for covers.
- Typical parts: gaskets, base, lid, fasteners, screw bosses/recess, cable openings and protection.

### Source:

[https://www.aliexpress.com/item/32920105599.html?src=google&src=google&albch=shopping&acnt=708-803-3821&slnk=&plac=&mtctp=&albbt=Google\\_7\\_shopping&albag=n=888888&isSmbAutoCall=false&needSmbHouyi=false&albcpr=11492545420&albag=112296941236&trgt=539263010115&crea=en32920105599&netw=u&device=c&albpq=539263010115&albpd=en32920105599&gclid=CjwKCAjwn8SLBhAyEiwAHNTJbZiCjJMCP79AIdGgYkQZntga\\_kczg2ruB6B2IXGti3lxN-unSgyJgRoCyMkQAvD\\_BwE&gclsrc=aw.ds&aff\\_fcid=ffae13111eee4cc5ba9acf6d3dd86e96-1634822771401-00650-UneMJZVf&aff\\_fsk=UneMJZVf&aff\\_platform=aaf&sk=UneMJZVf&aff\\_trace\\_key=ffae13111eee4cc5ba9acf6d3dd86e96-1634822771401-00650-UneMJZVf&terminal\\_id=1c096393c7ea417280526e4b68f268c6](https://www.aliexpress.com/item/32920105599.html?src=google&src=google&albch=shopping&acnt=708-803-3821&slnk=&plac=&mtctp=&albbt=Google_7_shopping&albag=n=888888&isSmbAutoCall=false&needSmbHouyi=false&albcpr=11492545420&albag=112296941236&trgt=539263010115&crea=en32920105599&netw=u&device=c&albpq=539263010115&albpd=en32920105599&gclid=CjwKCAjwn8SLBhAyEiwAHNTJbZiCjJMCP79AIdGgYkQZntga_kczg2ruB6B2IXGti3lxN-unSgyJgRoCyMkQAvD_BwE&gclsrc=aw.ds&aff_fcid=ffae13111eee4cc5ba9acf6d3dd86e96-1634822771401-00650-UneMJZVf&aff_fsk=UneMJZVf&aff_platform=aaf&sk=UneMJZVf&aff_trace_key=ffae13111eee4cc5ba9acf6d3dd86e96-1634822771401-00650-UneMJZVf&terminal_id=1c096393c7ea417280526e4b68f268c6)

# DESIGN DEVELOPMENT

MARKET RESEARCH (Waterproof electronic housings)



**ELECTRONICS HOUSING:** for products used outdoors or exposed to water.

**Electronics housing contains:**

- PCB board
- Elastic LED screen
- Humidity sensor
- Fans (x2)
- Full spectrum grow lights strip

**Housing must:**

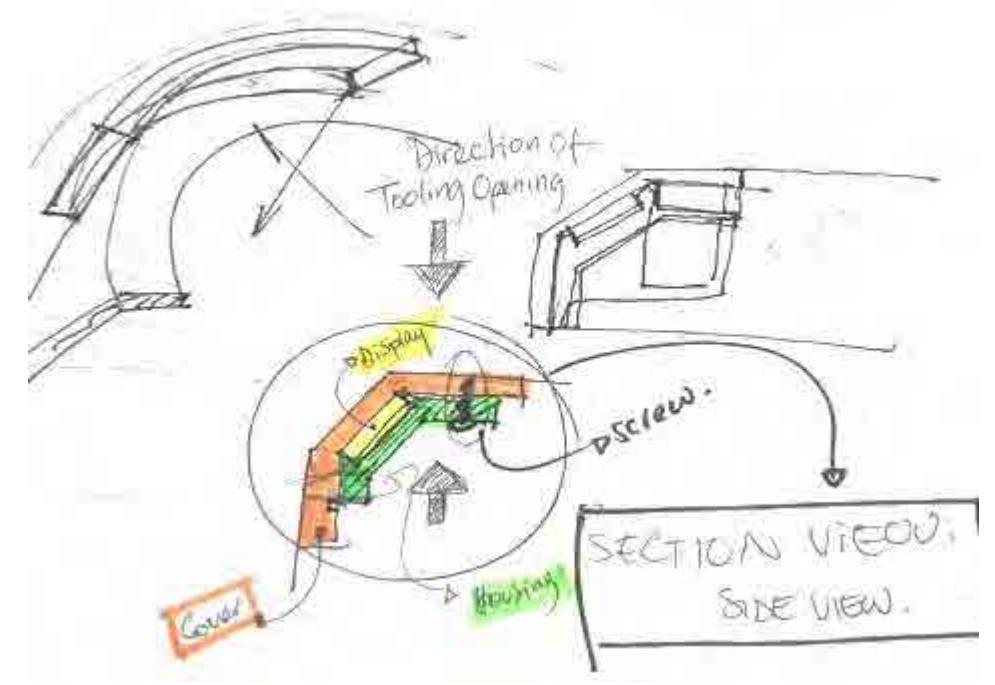
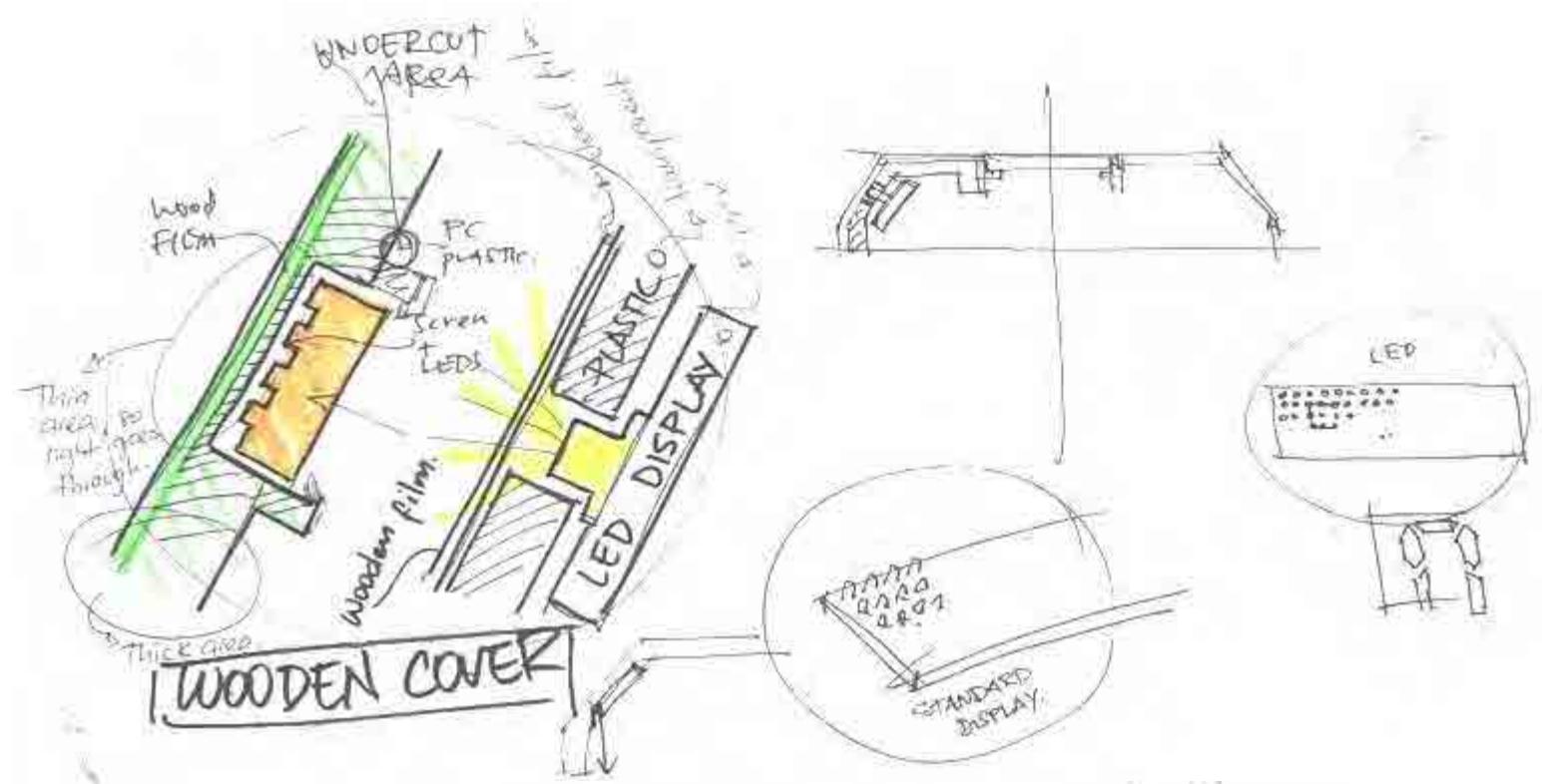
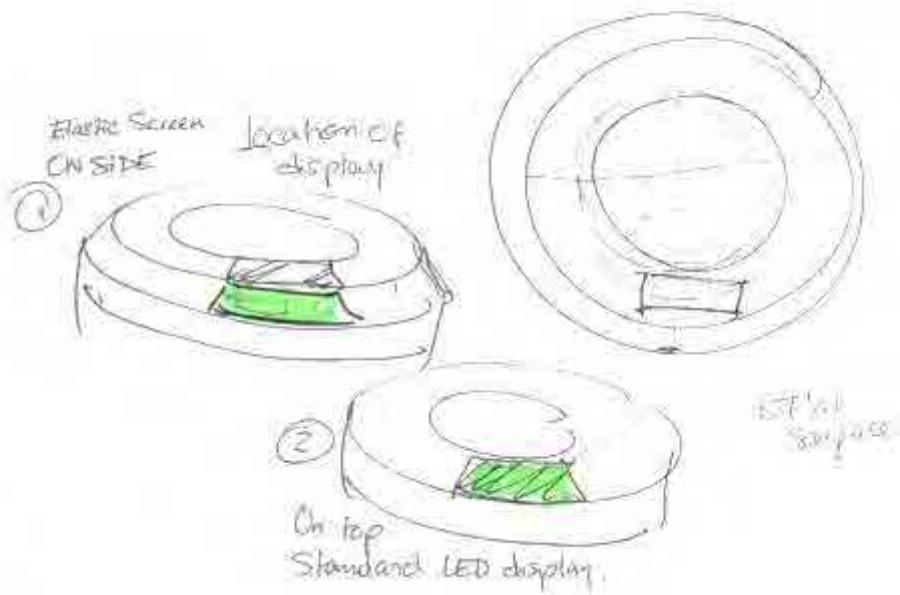
- Be see through
- Protect all electronics from water/humidity but allow fan to have direct access to the rest of the product to aid air circulation and humidity sensors to be able to sense humidity in the main body where the cuttings are.
- Have a cut where the screen is so the screen is in direct contact with the main cover so it can be activated through touch.

Sources:  
<https://www.custompartnet.com/estimate/injection-molding/?units=1>



# DESIGN DEVELOPMENT

## DISPLAY/ELECTRONICS LOCATION and top part design spec



- DISPLAY USED will be on a **CURVED SURFACE** so it would need an **elastic display LED display**.
- display will be located on the chamfer edge of the wooden cover so user can place objects on the top and not having to worry about display being blocked or hidden by an object.
- Display will be placed in an **electronic housing** made from **transparent plastic** and place on the inside of the cover, underneath a thin layer of plastic so the LED lights can be seen through the cover.

# DETAILS INSPIRATION

Inspiration (product legs, transitions, color and materials)



# PROTOTYPE 1 (large) TESTING

Context (dimensions and location)

STAND MODE



COFFE TABLE MODE



PRODUCT HEIGHT



Product Dimensions: 30cm diameter & 70 cm high

## PROTOTYPE TEST comments:

- 70cm Height is a bit too high, specially when placed next to a sofa.
- 30cm diameter is a bit too large, decrease it by few cm's. Just enough space so it can hold lamps, plants or vases and has space on the sides, so it is not too close to the edge.
- The product can be used to place decorative elements such as plants and vases or as a coffee table anywhere in the living room including next to a sofa or next to a tv.

# PROTOTYPE 2 (small) TESTING

Context – Living room (dimensions and location)

NEXT TO THE SOFA



NEXT TO THE TV



PRODUCT HEIGHT



**Product Dimensions: 20cm diameter & 58 cm high**

**PROTOTYPE TEST comments:**

- 60cm Height is a good and appropriate height for a table/stand furniture.
- The product can be placed anywhere in the living room including next to a sofa or next to a tv.
- 20cm diameter is the minimum, maybe increase it a few extra centimeters to have enough room to place different objects on, such as a plant, a lamp or vase so they are not too close to the edge.

# PROTOTYPE 2 (small) TESTING

PRODUCT – insert (activity)



INSERT DIAMETER



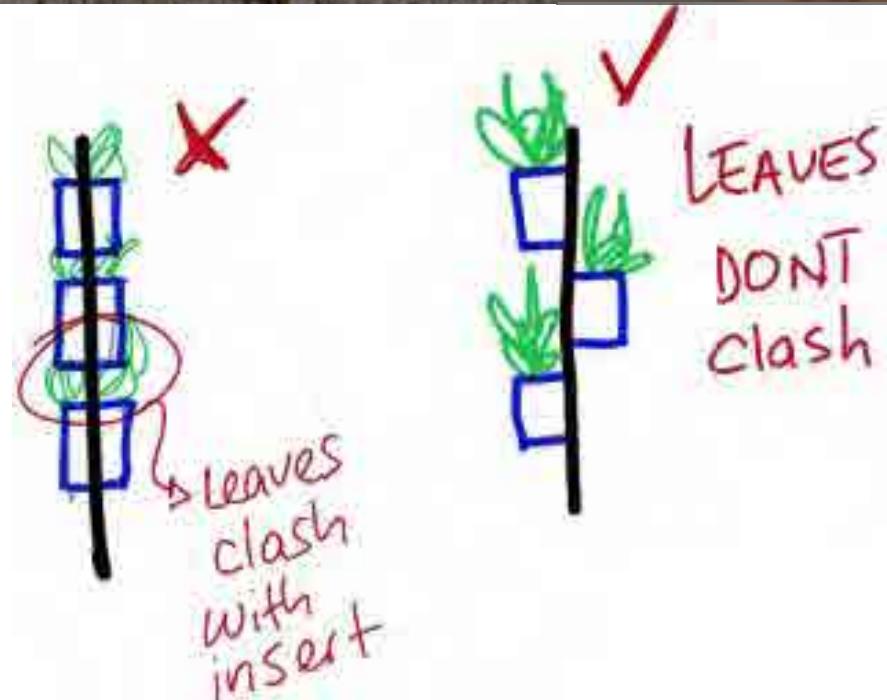
INSERT HEIGHT



INSERT INSIDE PRODUCT

## PROTOTYPE TEST comments:

- Plastic cup was taped to the side of the pole.
- Plastic cup dimensions: Top diameter was 7.5cm and 11cm high.
- Higher than needed for small size cuttings. Although, **this height might be good for bigger cuttings.**
- The diameter of the prototype allows space for several medium size cuttings as seen in the picture.
- Diameter cannot be bigger otherwise leaves will crash with the sides of the wall of the cylinder.



INSERT  
(off to the side of the pole)

# PROTOTYPE 2 (small) TESTING

ACTIVITY – plant cuttings, insert and main product.



PRODUCT HEIGHT



POLE HEIGHT



INSERTS HEIGHT



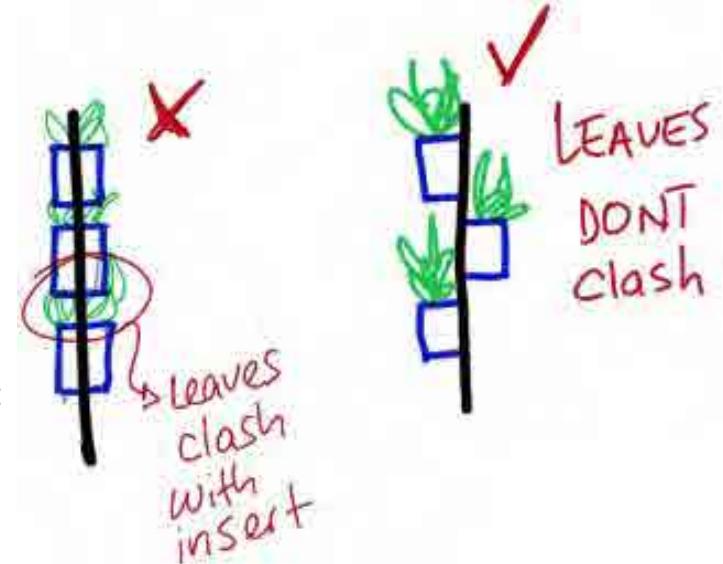
POLE HEIGHT

## ACTIVITY involves:

- User will place cuttings inside inserts.
- Plant cuttings will vary in size base on plant species and maturity.
- Inserts will be attached to and removed from the pole.
- Inserts need enough room for root development and decent height to hold cutting upright.
- User will monitor root development to know when cutting is ready to be potted.
- User will monitor cutting to ensure roots are healthy and treat them ASAP if they are rotting (color changes).
- User will remove cuttings from insert and untangle roots to pot them (when different plant species are in the same insert).

## TEST FINDINGS (plastic cup used):

- Inserts' height can be shorter than plastic glass height (in picture). So that more inserts can fit. The plastic glass in the picture is taller than needed for the cutting anyways, with space to spare.
- The orientation of the insert must alternate (left & right) so the leaves don't crash with the bottom of the insert above if they are placed on top of each other (refer to sketch on the right).



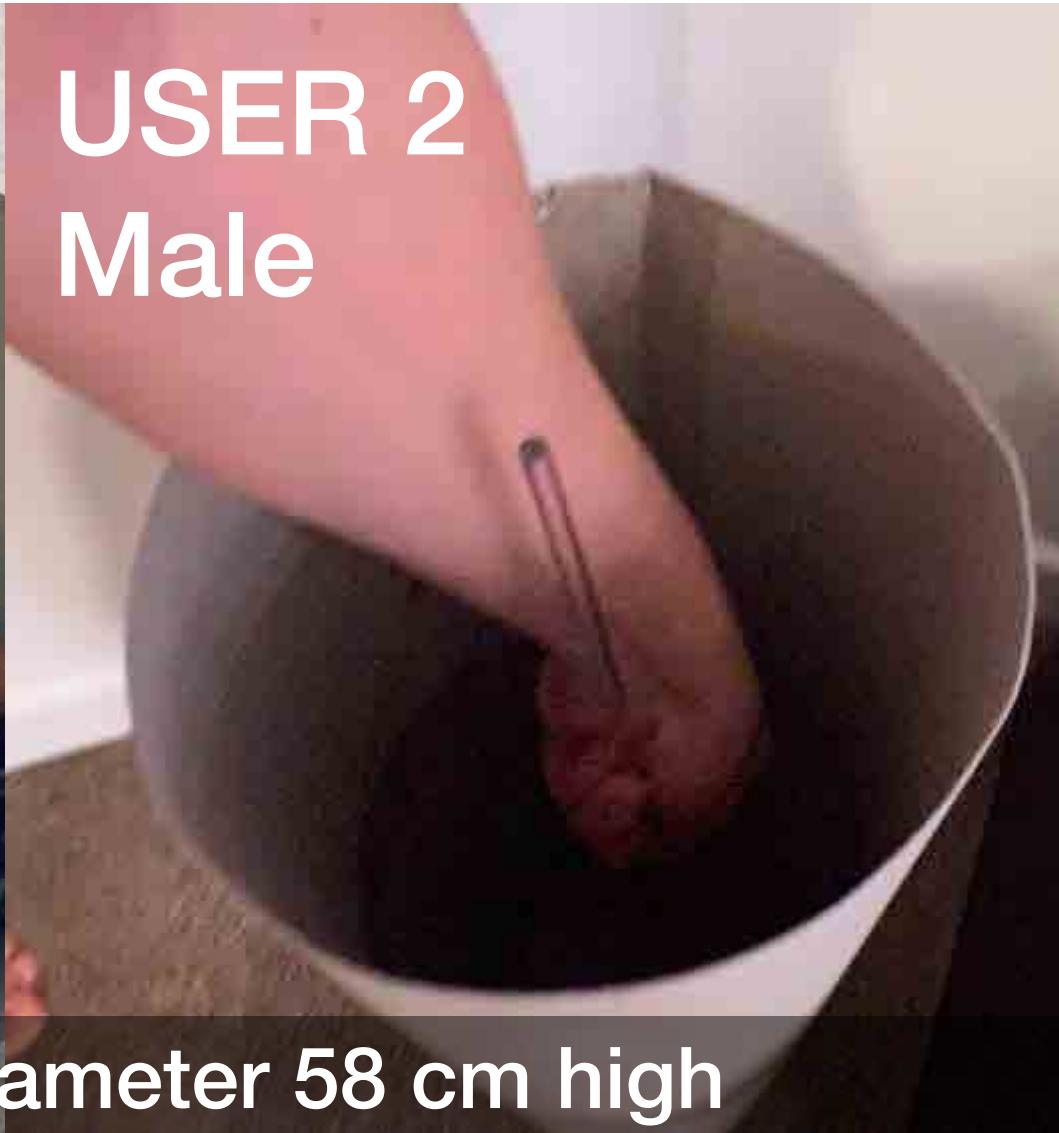
# PROTOTYPE 2 (small) TESTING

ACTIVITY – Cylinder space for larger and smaller user.

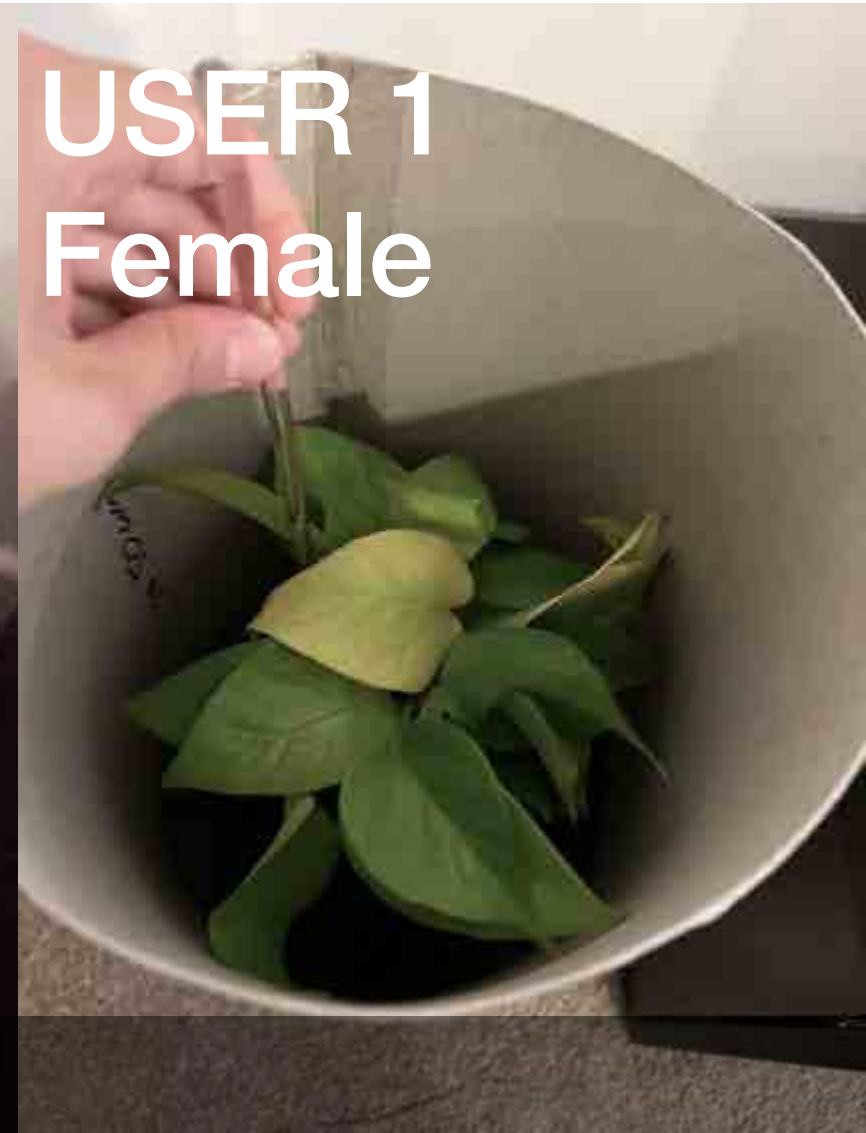
USER 1  
Female



USER 2  
Male



USER 1  
Female



Product is 20cm diameter 58 cm high

## ACTIVITY involves:

- User needs to put hand inside to **remove pole** with attached inserts out the cylinder and **place it back in** the cylinder.
- User needs to **put arm inside** the cylinder to be able to **clean** the product
- User needs to be able to take **pole out of the cylinder and place it somewhere** to access/remove/monitor plant cuttings.

## TEST FINDINGS:

- Increase** a bit more the **diameter** of the product from 20 to 25cm to have a bit more room.
- Add a part to the top of the pole** that the user can better grasp on when holding the pole. This will prevent accidentally dropping the pole.
- Provide a base to the pole** so it can stand on the floor when the person takes it out, and the person doesn't need to hold them.
- The **inserts** should also **be able to stand** on the floor, so the user doesn't need to hold them whilst

# ELECTRONIC HOUSING PARTS

## ELECTRONICS and their dimensions

**Flexible LED Strip Light | RGB COB | 15W/m 24V IP20**

**RGB**

- 15 WATTS
- 24 VOLTAGE
- RGB COLOUR
- LUMENS
- IP20 INDOOR
- 5m LENGTH
- COB LED CHIP
- 840 CHIPS/m
- 25mm CUTTABLE
- 10mm TAPE WIDTH
- CRI



### UNO DEVELOPMENT BOARD WITH USB CABLE FOR ARDUINO

Powerful and low cost solution for STEM applications



Specifications	
SKU	TA0000
Barcode #	951134002414
Brand	Arduino
Shipping Weight	0.100kg
Shipping Width	0.120m
Shipping Height	0.040m
Shipping Length	0.100m
Shipping Cube	0.000208000m <sup>3</sup>
Unit Of Measure	EA
Assembled Length	0.050m
Assembled Height	0.050m
Assembled Width	0.075m

### TEMPERATURE AND HUMIDITY SENSOR MODULE FOR ARDUINO PROJECTS



#### Specs:

- Arduino™ library available.
- Protocol: 1-Wire(Not Dallas 1-wire, one data pin is required per sensor used)
- Temperature Range: -40 °C - 80 °C +/- 0.5 °C
- Humidity Range: 20 - 90% +/- 2%
- Sample Rate: 0.5Hz
- Dimensions: 52(W) x 20(L) x 13(H)mm

## Raspberry Pi, LCD Touch Screen with 7in Capacitive Touch Screen



### Cooler Axial Fan 12V 40x40x10mm For Arduino Raspberry Pi Computer 3D printer

Brand: MornPowerAllie



#### Technical Details

##### Specifications:

- Operating voltage: 5V
- Current: 0.2 A
- Brushless DC fan
- Fan dimensions: 30mm x 30mm x 8mm
- Molex PicoBlade connector
- Mounting screws & nuts included

### FLEXIBLE 8 X 32 RGB LED MATRIX DISPLAY

RGB Pixels that are independently addressable

SKU: TA0804



#### Specifications:

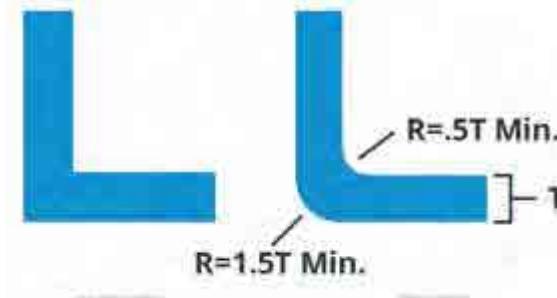
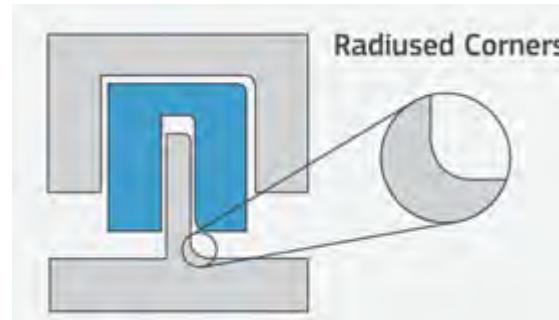
- LED Chip : SMD5050 RGB LED chip
- IC Chip : WS2812B/WS2811 IC built-in SMD5050 RGB LED chip)
- LED Quantity : 256 LEDs
- Input Voltage : DC5V
- Watts :5W/Max
- IP Rating : IP20(non-waterproof)
- PCB Color : Black PCB
- View Angle : 140°
- Color Addressable : full color
- PCB Pitch : 10mm
- PCB Size : 320mm x 80mm

# MANUFACTURING RESEARCH

## INJECTION MOULDING rules- Top part

**ABS** (acrylonitrile butadiene styrene) is a common injection molding material that can be sourced and molded relatively easily, at an accessible price point. It's a strong, sturdy material that offers good impact resistance, is easily machined, and meets a variety of aesthetic requirements. The resin is not ideal for parts that will be subjected to sustained intense heat as it will warp or melt above / around 200 degrees Fahrenheit.

**Polycarbonates** are a high-grade class of thermoplastics that are easily molded and often increases shatter resistance. Naturally transparent, polycarbonate is ideal for high-strength glass-like applications (safety goggles, medical lab applications and more). Polycarbonate isn't suited for applications where a higher degree of flexibility is needed or colored aesthetic choices.



### Size Maximum Dimensions

SIZE	480mm x 751mm
VOLUME	366,837 cu. mm
DEPTH	101mm from parting line lip is 203.2mm if the parting line can pass through the middle of the part
PROJECTED MOLD AREA	112,903 sq. mm

MATERIAL	RECOMMENDED WALL THICKNESS
ABS	0.045 in. - 0.140 in.
Acetal	0.030 in. - 0.120 in.
Acrylic	0.025 in. - 0.500 in.
Liquid Crystal Polymer	0.030 in. - 0.120 in.
Long-Fiber Reinforced Plastics	0.075 in. - 1.000 in.
Nylon	0.030 in. - 0.115 in.
Polycarbonate	0.040 in. - 0.150 in.
Polyester	0.025 in. - 0.125 in.
Polyethylene	0.030 in. - 0.200 in.
Polyphenylene Sulfide	0.020 in. - 0.180 in.
Polypropylene	0.035 in. - 0.150 in.
Polystyrene	0.035 in. - 0.150 in.
Polyurethane	0.080 in. - 0.750 in.

AMORPHOUS RESINS	SEMICRYSTALLINE RESINS	COST
<b>High-Performance/Specialty</b> Polyetherimide or PEI Strength: High Heat & Chemical Resistance: High Applications: Aerospace	<b>High-Performance/Specialty</b> Polyetheretherketone or PEEK Strength: High Heat & Chemical Resistance: High Applications: Bearings, medical implants	Expensive
<b>Engineering</b> Polycarbonate or PC Transparent Strength: Moderate Heat Resistance: High Electric Insulator: High Applications: Electrical, windings	<b>Engineering</b> Polyimide or PA (Nylon) Strength: Moderate to high Chemical Resistance: High Abrasion Resistance: High Shrinkage and Warp: Low Applications: Auto parts, textiles	Moderate

SURFACE DESCRIPTION	MINIMUM DRAFT
For "near vertical" requirements	0.5°
Most common situations	2°
All shutoff surfaces	3°
Faces with light textures	3°
Faces with medium textures	5°+

SPI FINISH	DESCRIPTION	TYPICAL APPLICATIONS	ADDED EXPENSE
A-1	Grade #3, 6000 Grit Diamond Buff	High polish parts	\$\$\$\$\$
A-2	Grade #6, 3000 Grit Diamond Buff	High polish parts	\$\$\$\$
A-3	Grade #15, 1200 Grit Diamond Buff	High-low polish parts	\$\$\$\$
B-1	600 Grit Paper	Medium polish parts	\$
B-2	400 Grit Paper	Medium polish parts	\$
B-3	320 Grit Paper	Medium-low polish parts	\$
C-1	600 Stone	Low polish parts	\$
C-2	400 Stone	Low polish parts	\$
C-3	320 Stone	Low polish parts	\$
D-1	Dry Blast Glass Bead	Satin finish	\$
D-2	Dry Blast #240 Oxide	Dull finish	\$
D-3	Dry Blast #24 Oxide	Dull finish	\$
M2110XX	A variety of frame surface textures that are more coarse than SPI D-3. Please specify which texture is required before submitting the project.	Textured finish	\$\$\$\$

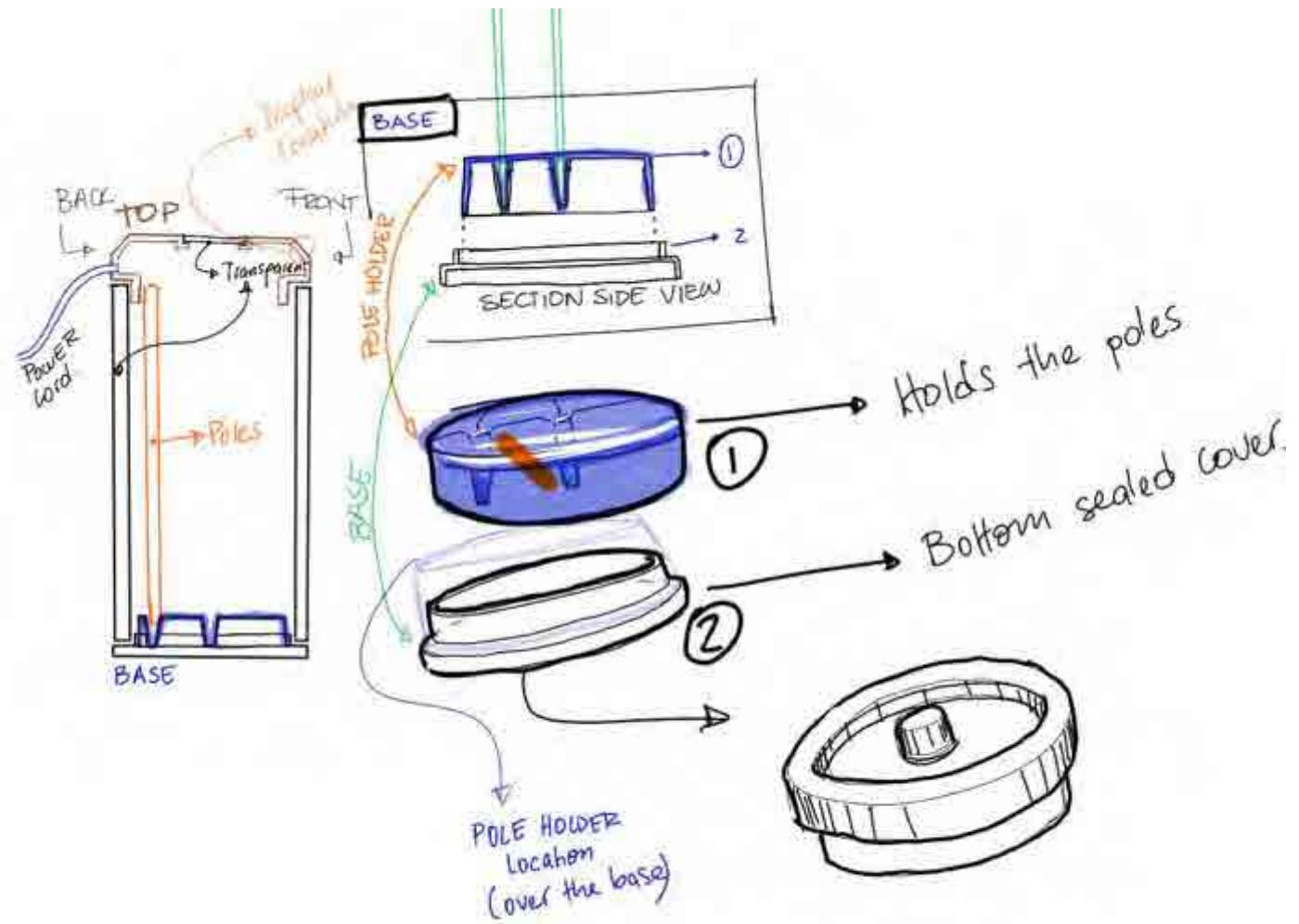
### Materials

- ABS
- PBT
- ABS/PC
- PC/PBT
- Acetal
- PEEK
- Acetal Copolymer
- PEI
- Acetal Homopolymer
- PET
- ETPU
- PETG
- HDPE
- PMMA
- LCP
- Polycarbonate
- LDPE
- Polypropylene
- LLDPE
- PPA
- Nylon 6
- PPE/PS
- Nylon 5/12
- PS

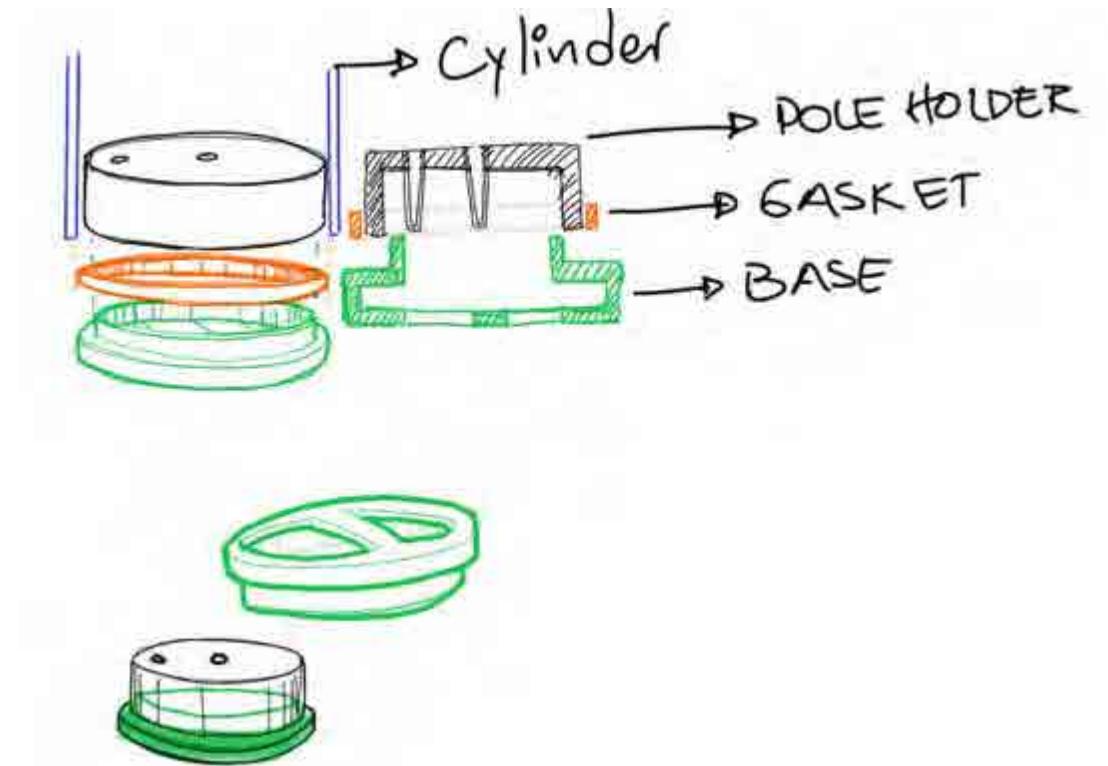
# DESIGN DEVELOPMENT

Pole, pole base and product base

Pole, pole base and product base LID design 1

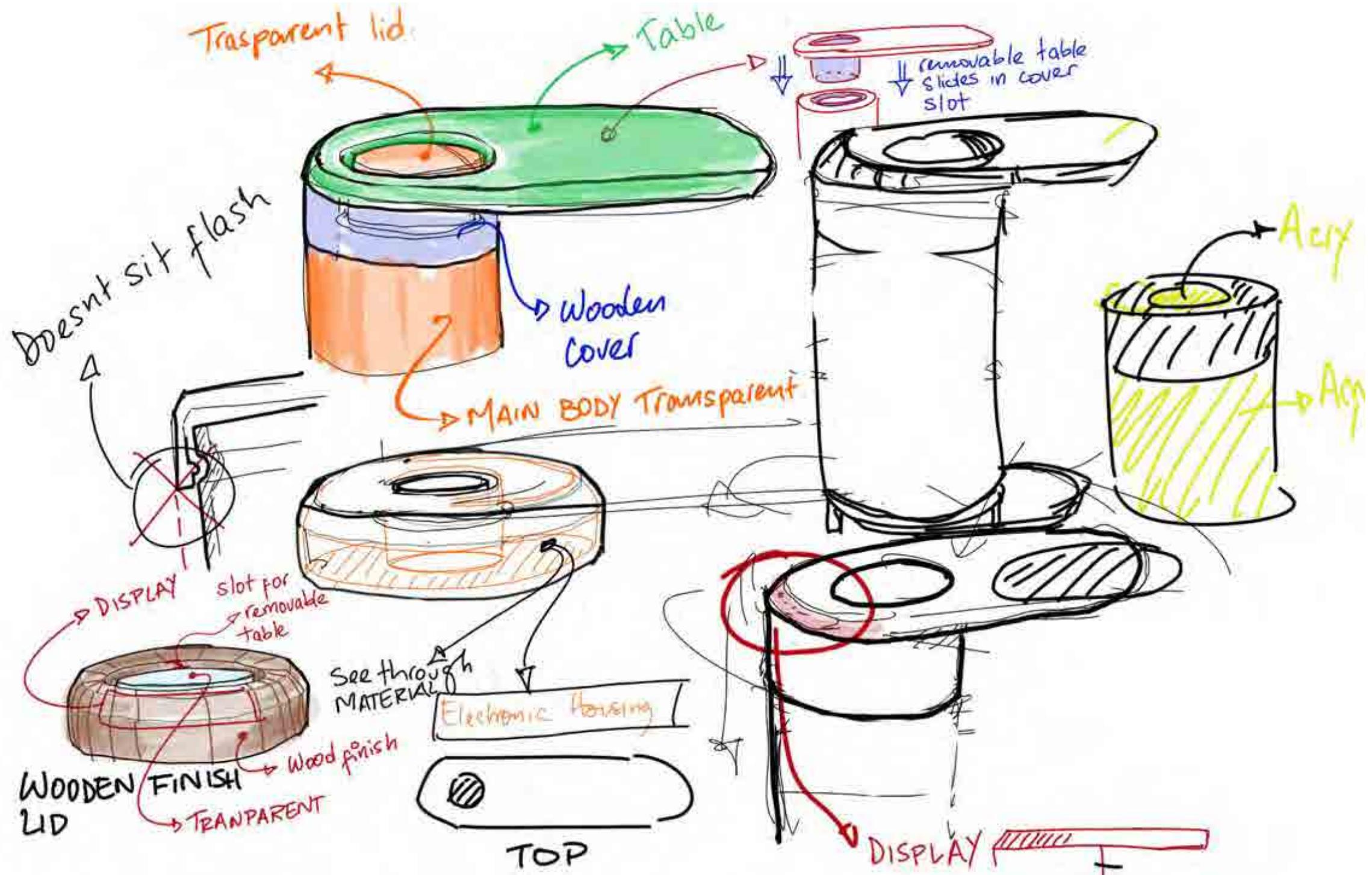


Pole, pole base and product base LID design 2



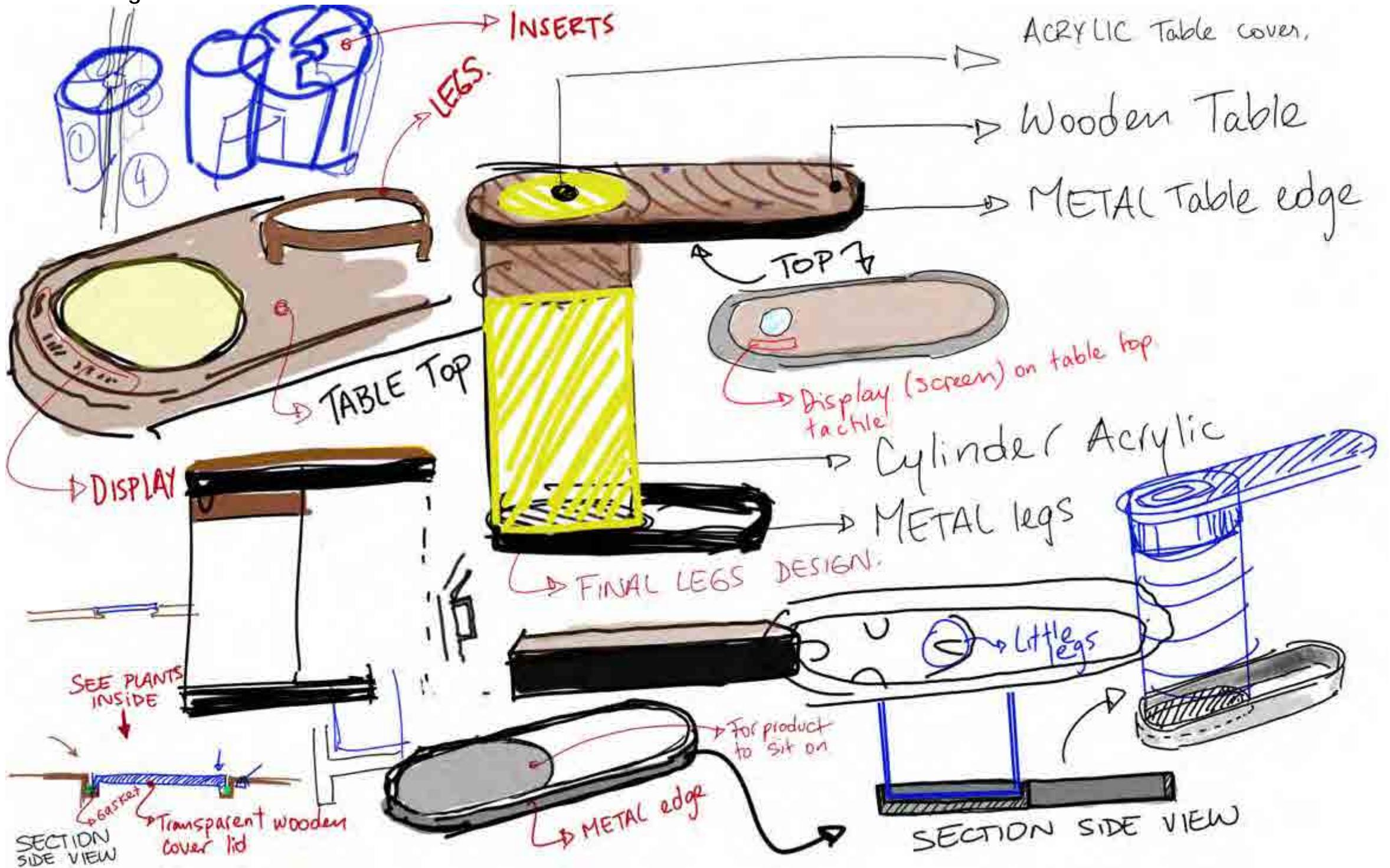
# DESIGN DEVELOPMENT

Top, display and electronic housing



# DESIGN DEVELOPMENT

resolving various details



# DESIGN DEVELOPMENT

## MANUFACTURING PROCESS AND MATERIAL – Cylinder (largest part)

### What Plastic Materials can you cast?

- Polystyrene
- Acrylic
- Nylon type 6
- Polyester
- Polyurethane

#### Properties of Acrylic

Acrylic is sometimes called Plexiglass, but Plexiglass is just one of many brands of acrylic. This particular material has several benefits, including:

- More affordable than both glass and polycarbonate
- Resists yellowing from the sun
- Better clarity than glass transmitting 92% of light
- Easier to machine and form
- Shiny material that can be polished to a smooth finish
- Has an impact resistance that is 17x that of glass
- Available in a range of colors

Comparison of ABS and Acrylic Property Values		
ABS	MATERIAL	Acrylic
-	WATER ABSORPTION RATING	0.2
6,500	TENSILE STRENGTH	10,000
320,000	FLEXURAL MODULUS	480,000
5.3	COEFFICIENT OF LINEAR THERMAL EXPANSION	4
-	DIELECTRIC STRENGTH	-

#### Material Properties

- Excellent impact strength
- Good fabricating and machining properties
- Excellent aesthetic properties
- Good chemical resistance
- Machines with ease
- Low heat conductivity
- Corrosion and abrasion resistant
- Low co-efficient of friction
- Incredibly durable
- Broad temperature range for application use
- Machinability
- UV resistant grades available
- Strong and stiff

### Blow Molding Materials



Whether you need a PP, PVC, Nylon or HDPE blow molding, Regency Plastics has the expertise to not only mold your part, but assist with the material selection process to ensure your parts' optimal performance and identify opportunities to drive cost out of your product. In addition to HDPE blow molding, some of our most commonly recommended and requested materials and finishes include:

- Polypropylene (PP)
- Polyethylene (HDPE, MDPE, LDPE)
- Nylon (PA)
- TPE, TPR & TPO
- PVC (Rigid & Flexible)
- ABS
- Glass or Talc Filled
- Glass & Color Matched
- Graining



#### Product Details

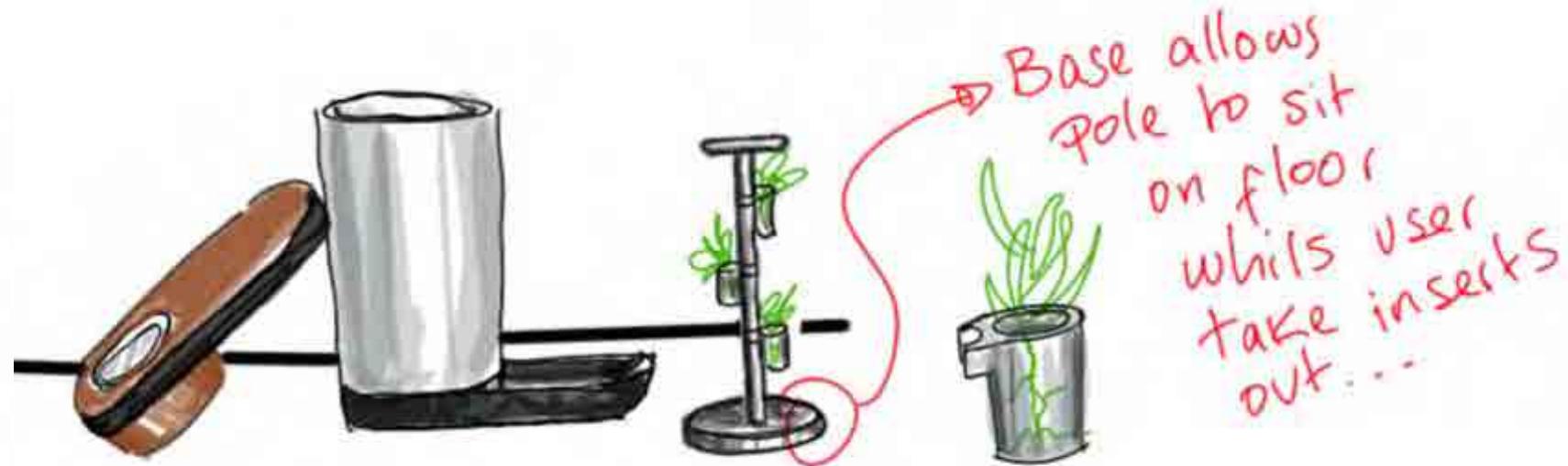
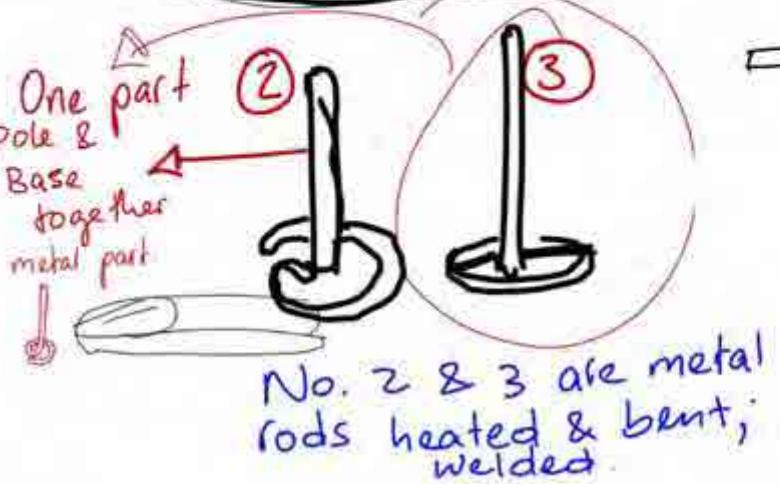
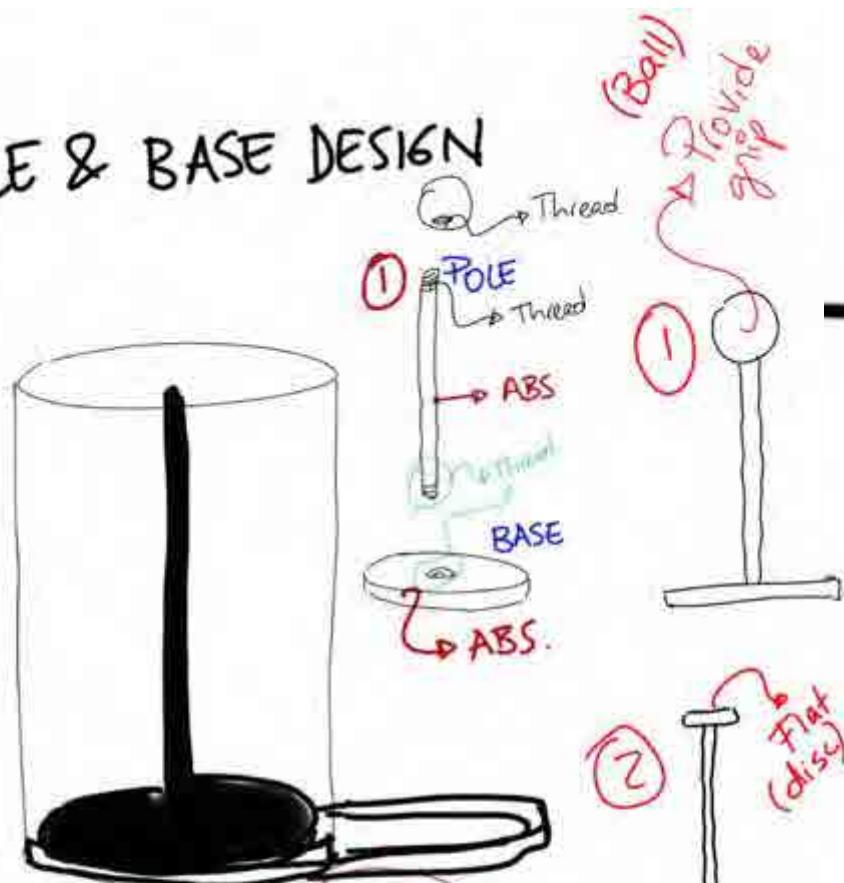
ABS Clear / Transparent Sheet for furniture

•ABS sheet is a very versatile and widely used thermoplastic. ABS is dimensionally stable and has a high impact strength. It is resistant to many chemicals and has an excellent high and low temperature performance. It can be cut, machined, drilled, heat bent and bonded. ABS sheets are commonly used in advertising printing ,Refrigerator, Automotive parts and so on .

# DESIGN DEVELOPMENT

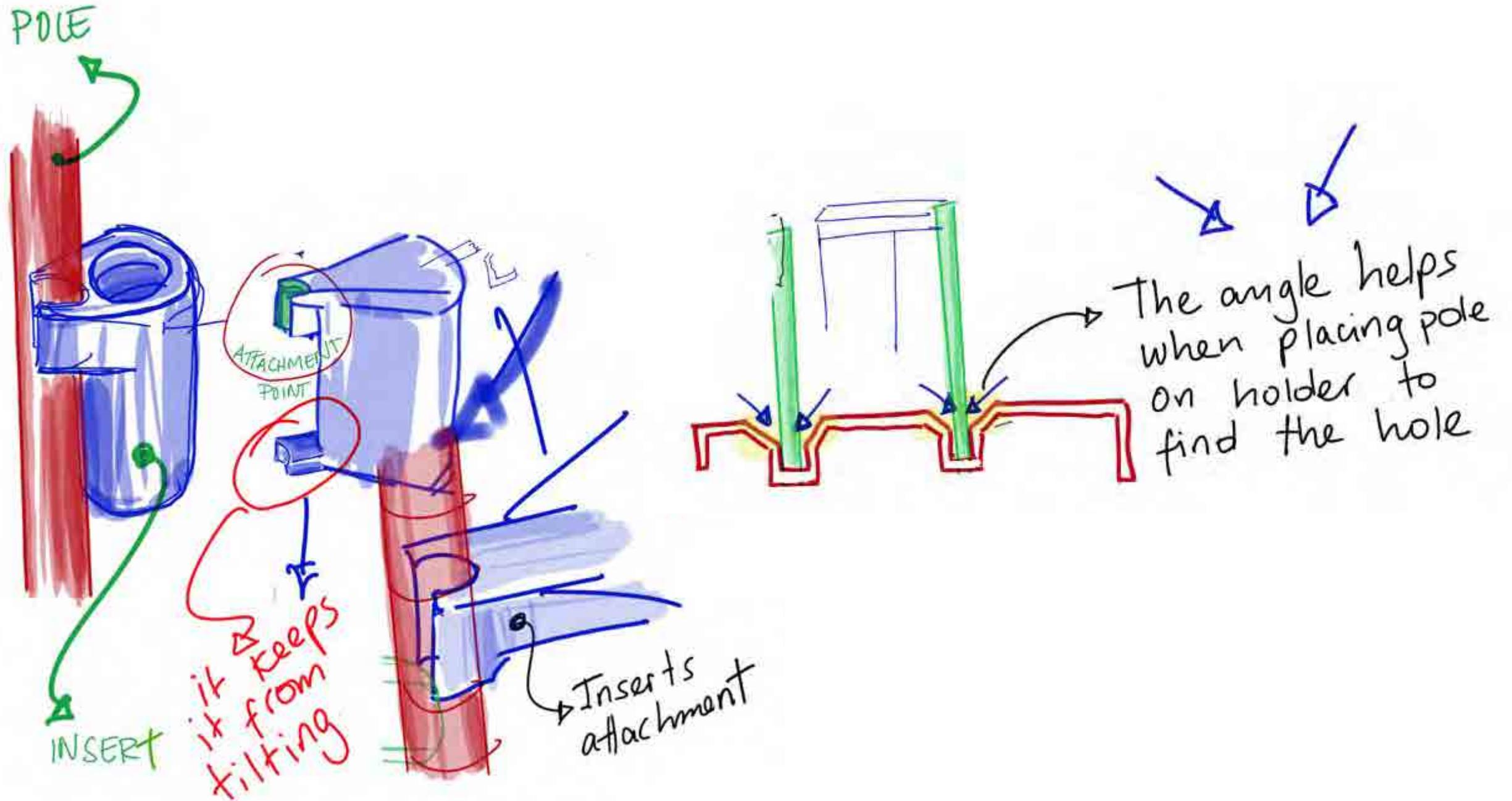
Pole and pole base design

## POLE & BASE DESIGN



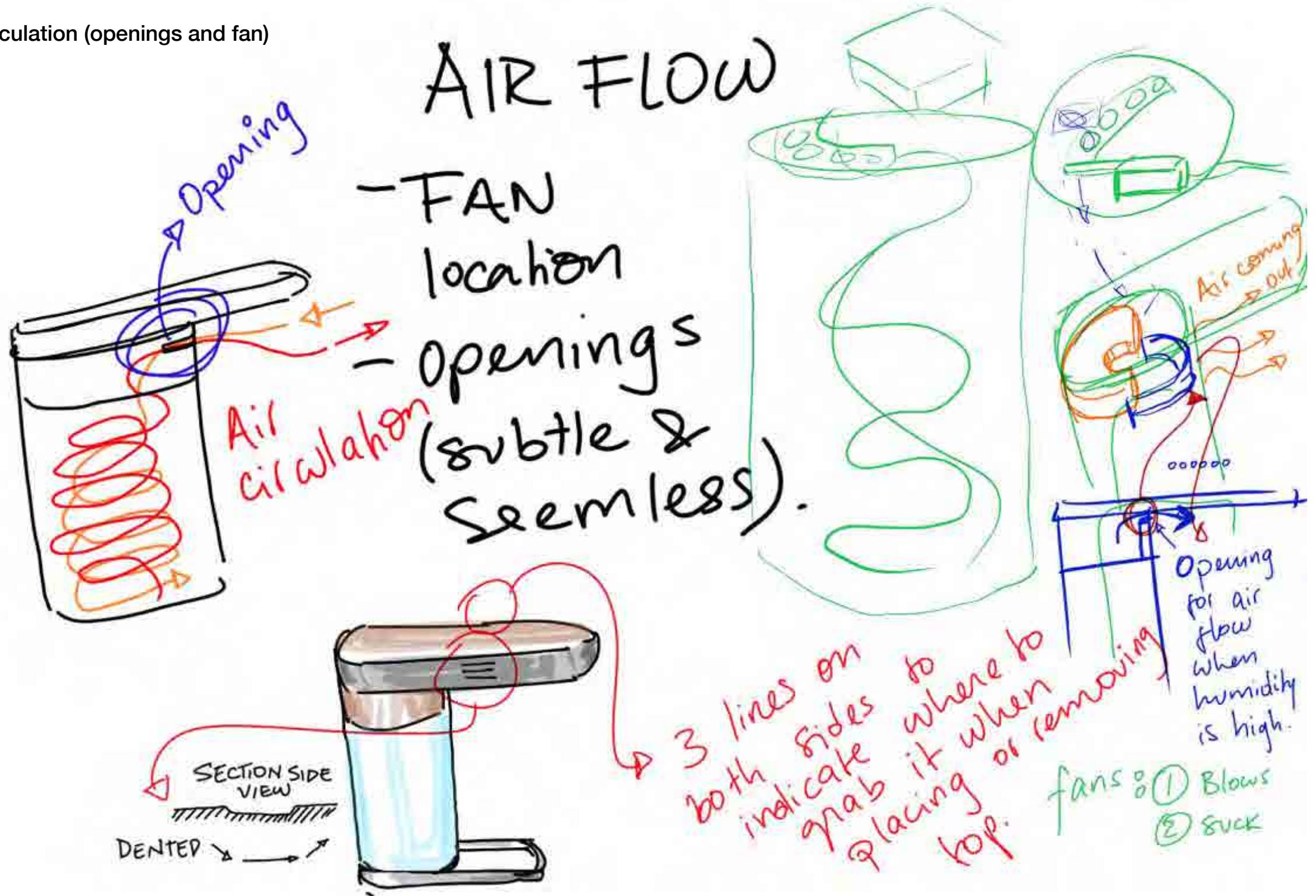
# DESIGN DEVELOPMENT

Inserts ,pole and base



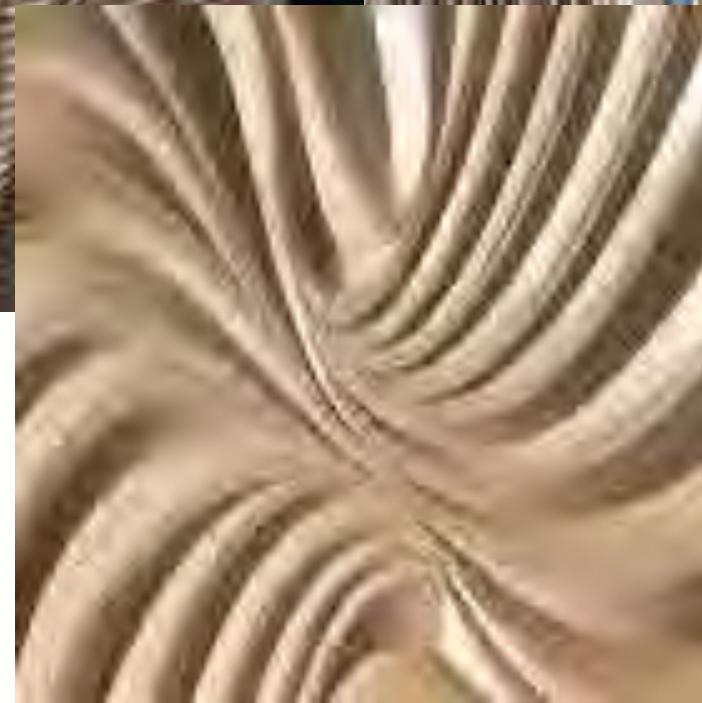
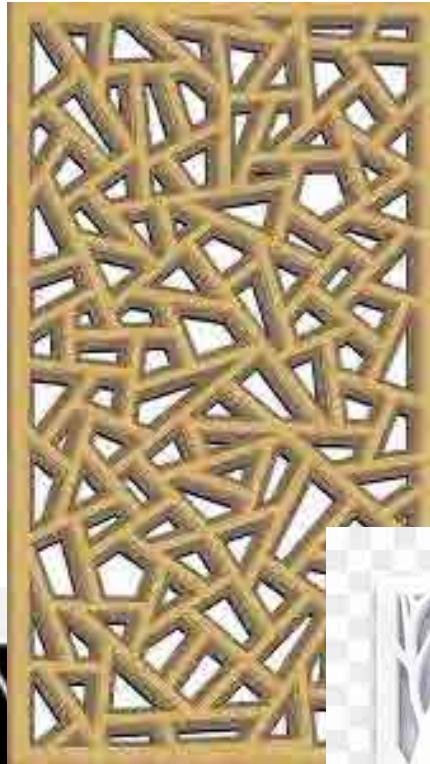
# DESIGN DEVELOPMENT

Air circulation (openings and fan)



# DESIGN DEVELOPMENT

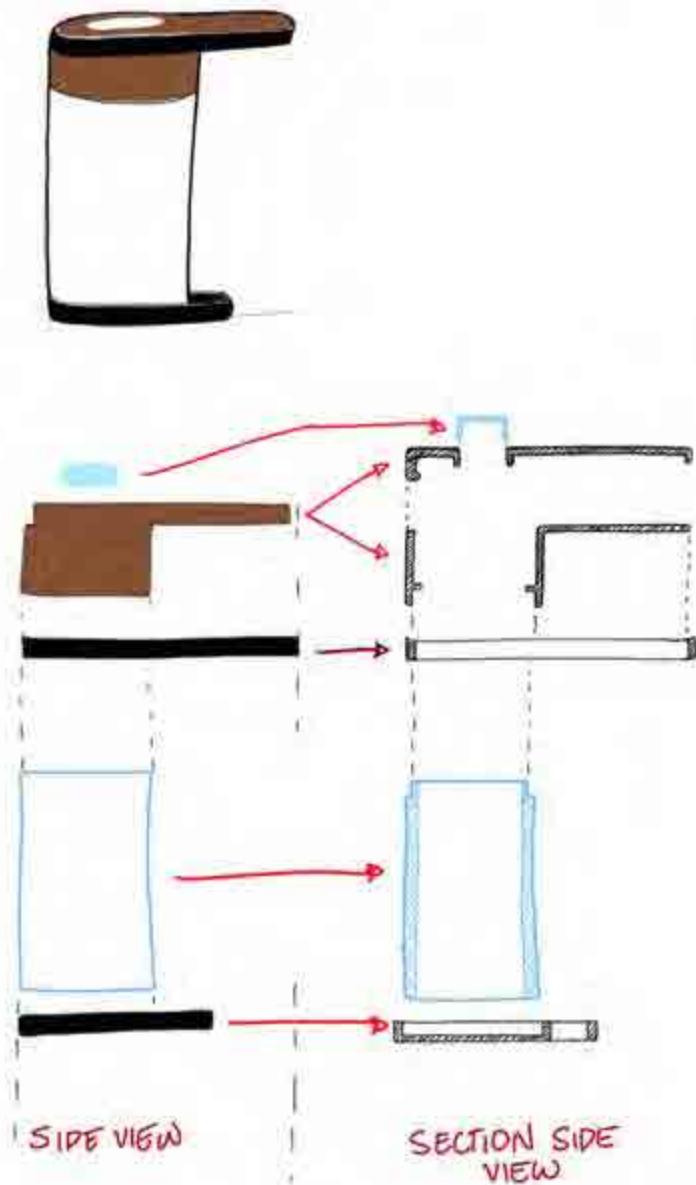
Air circulation – opening patterns (organic shapes)



# PROTOTYPE DEVELOPMENT

PROTOTYPING planning (number of parts, design and materials)

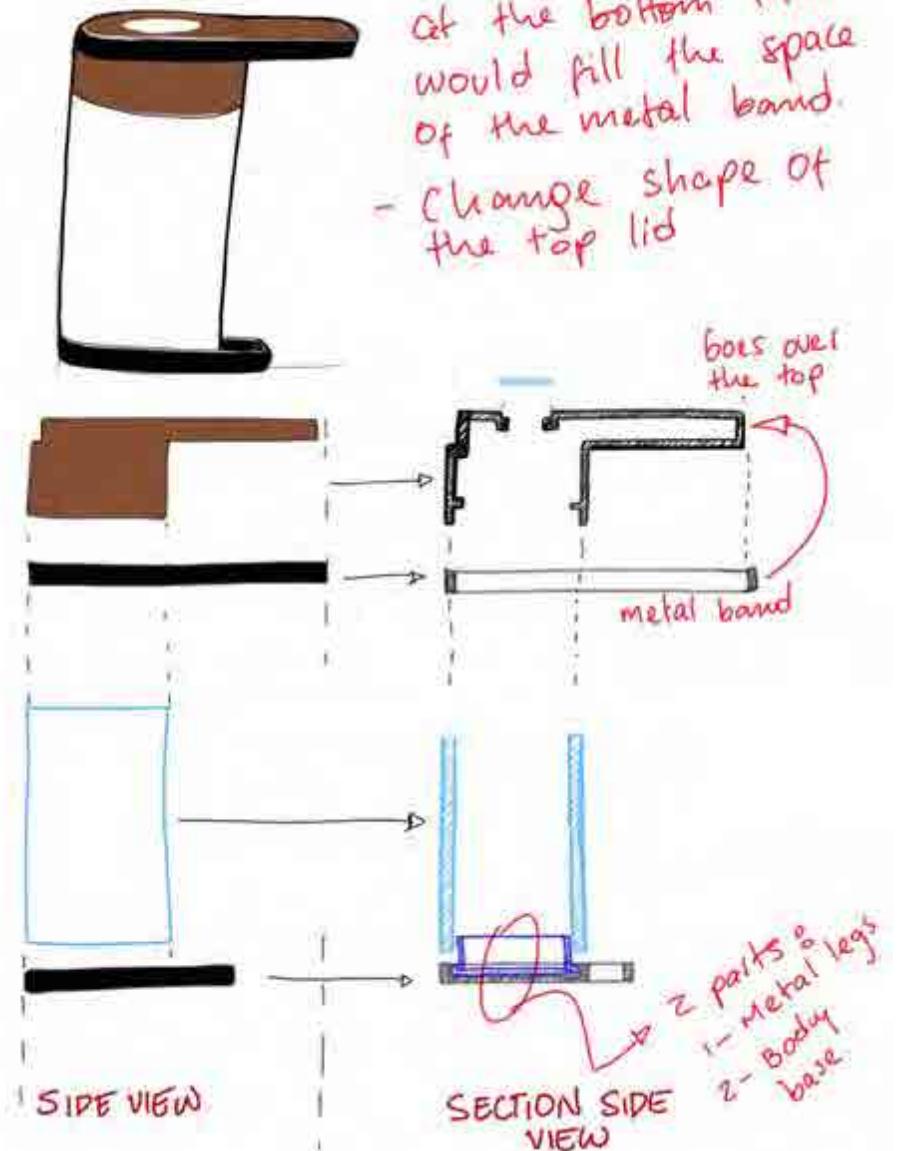
## PROTOTYPE PLANING I



## PROTOTYPE PLANING II

Comments:

- Join the 2 parts for the top table
- Included a base at the bottom that would fill the space of the metal band.
- Change shape of the top lid



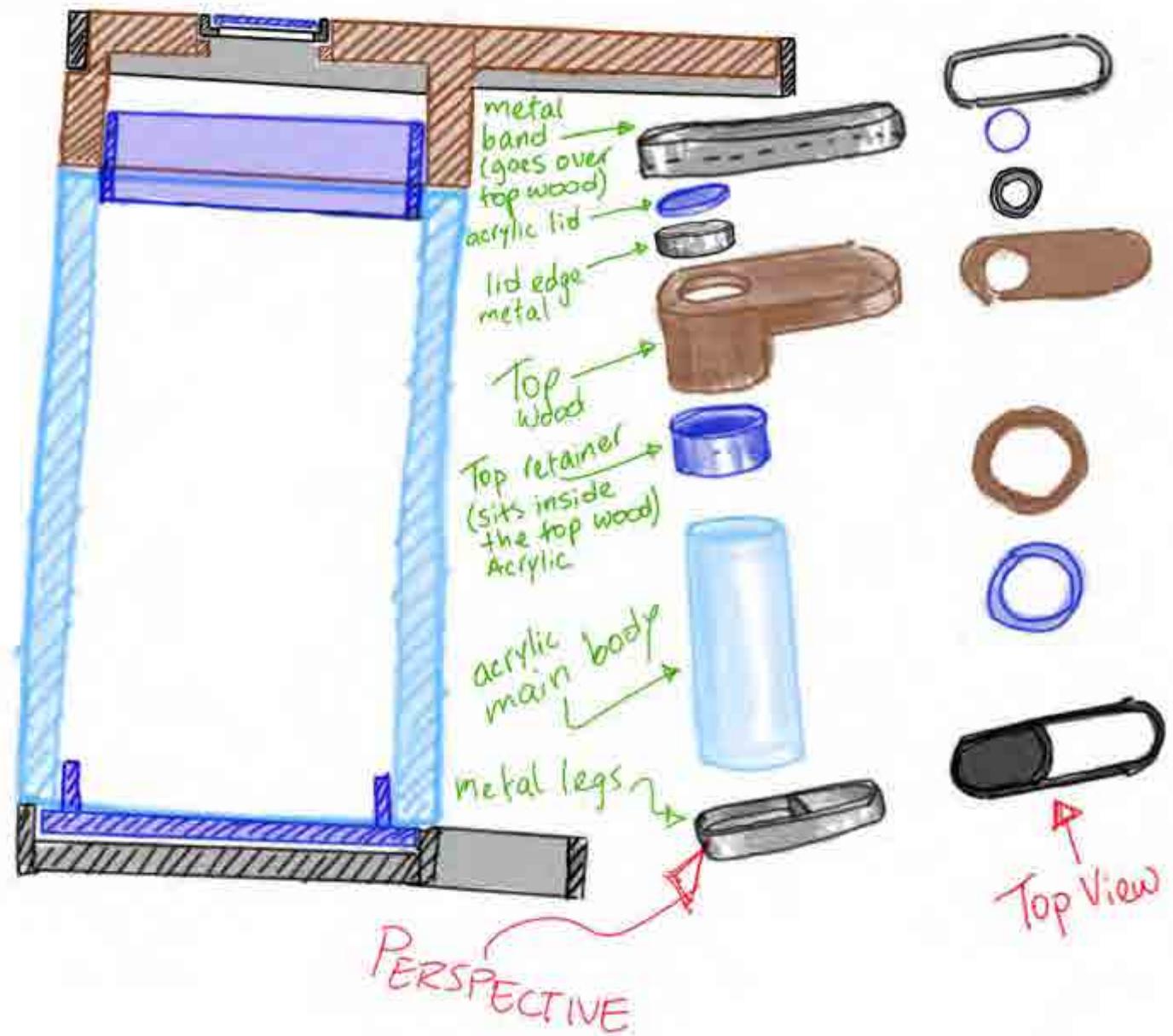
# PROTOTYPE DEVELOPMENT

PROTOTYPE PLANING parts, assembly and materials

## PROTOTYPE PLANING III

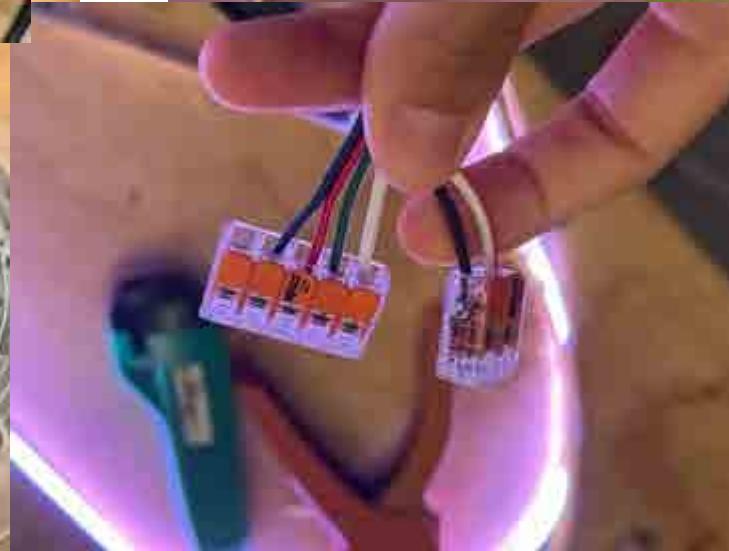
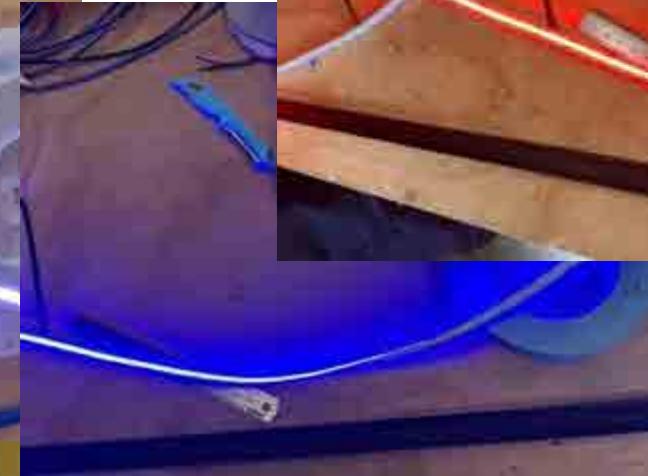
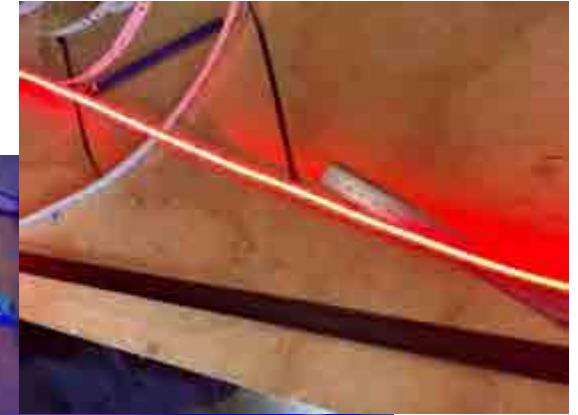
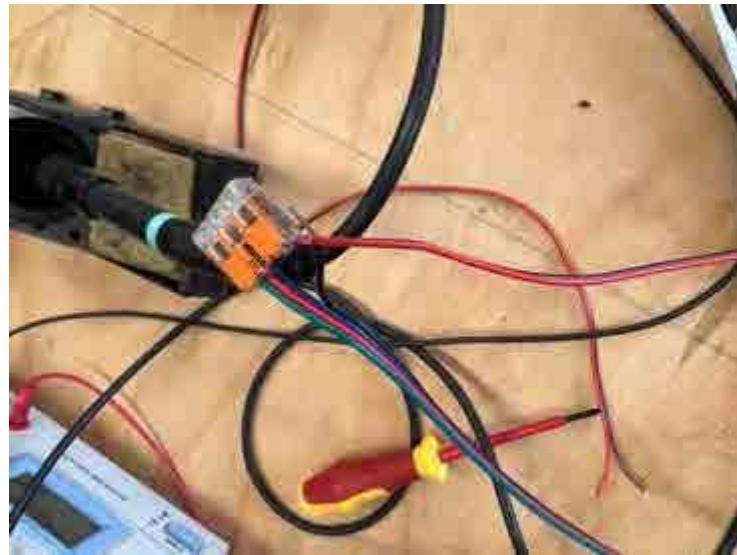
### NOTES

- All parts must sit flush with one another.



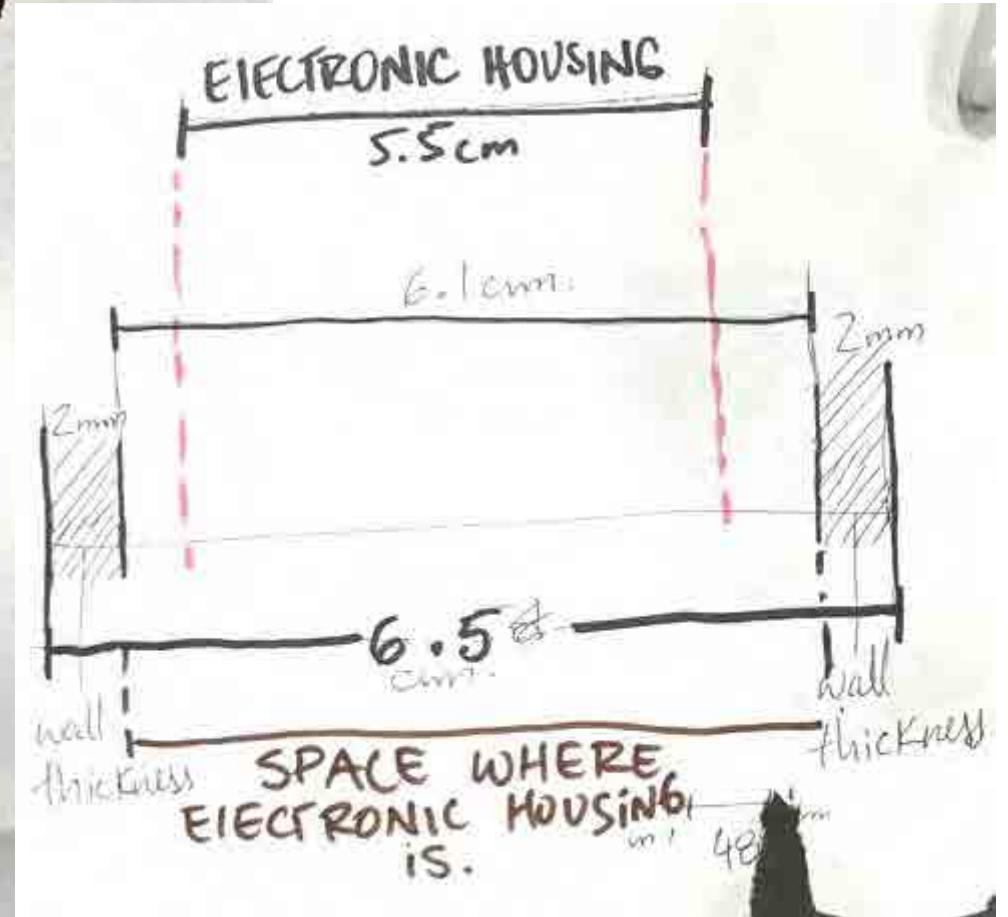
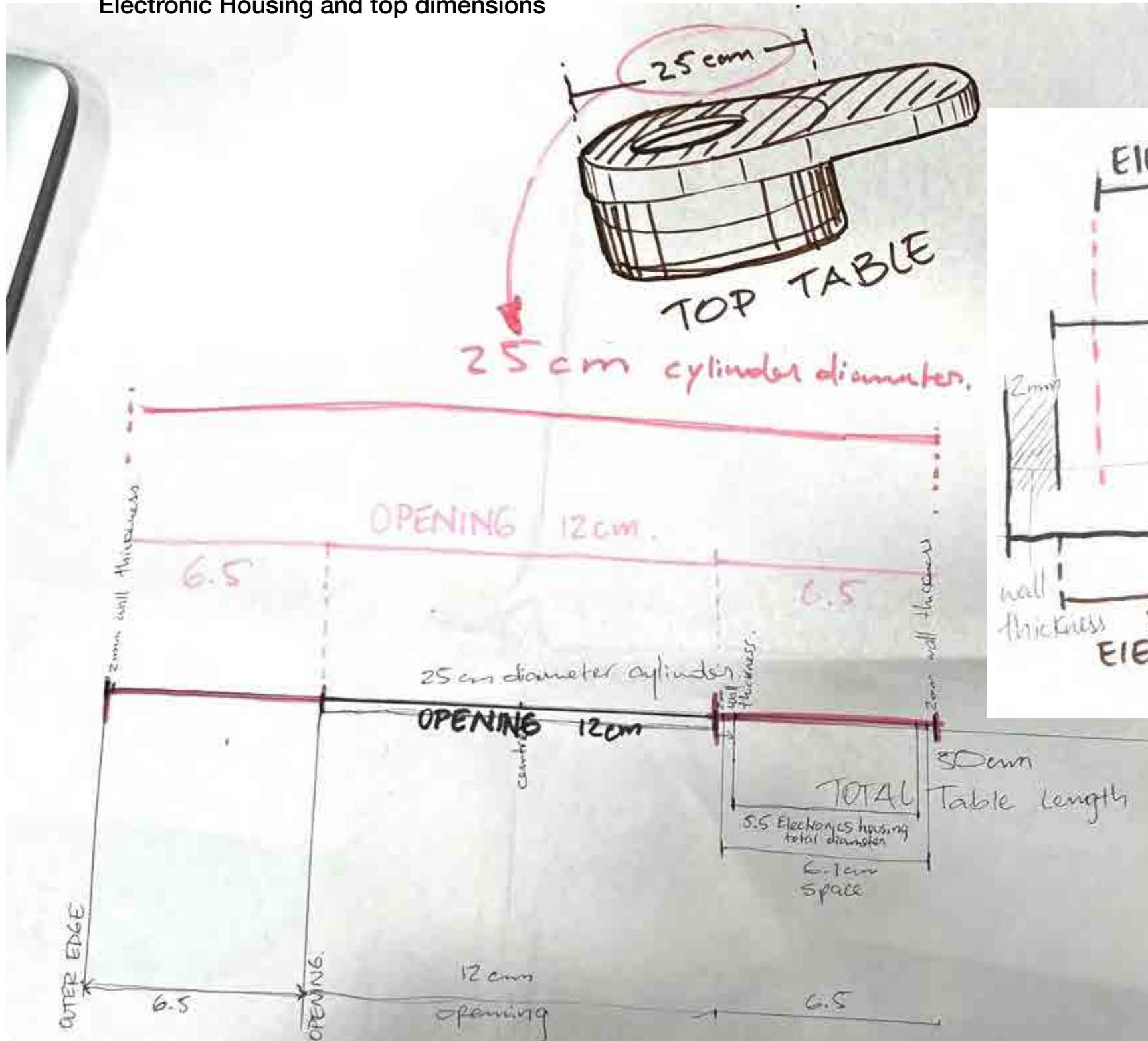
# PROTOTYPE DEVELOPMENT

GROW LIGHTS for prototype



# PROTOTYPE DEVELOPMENT

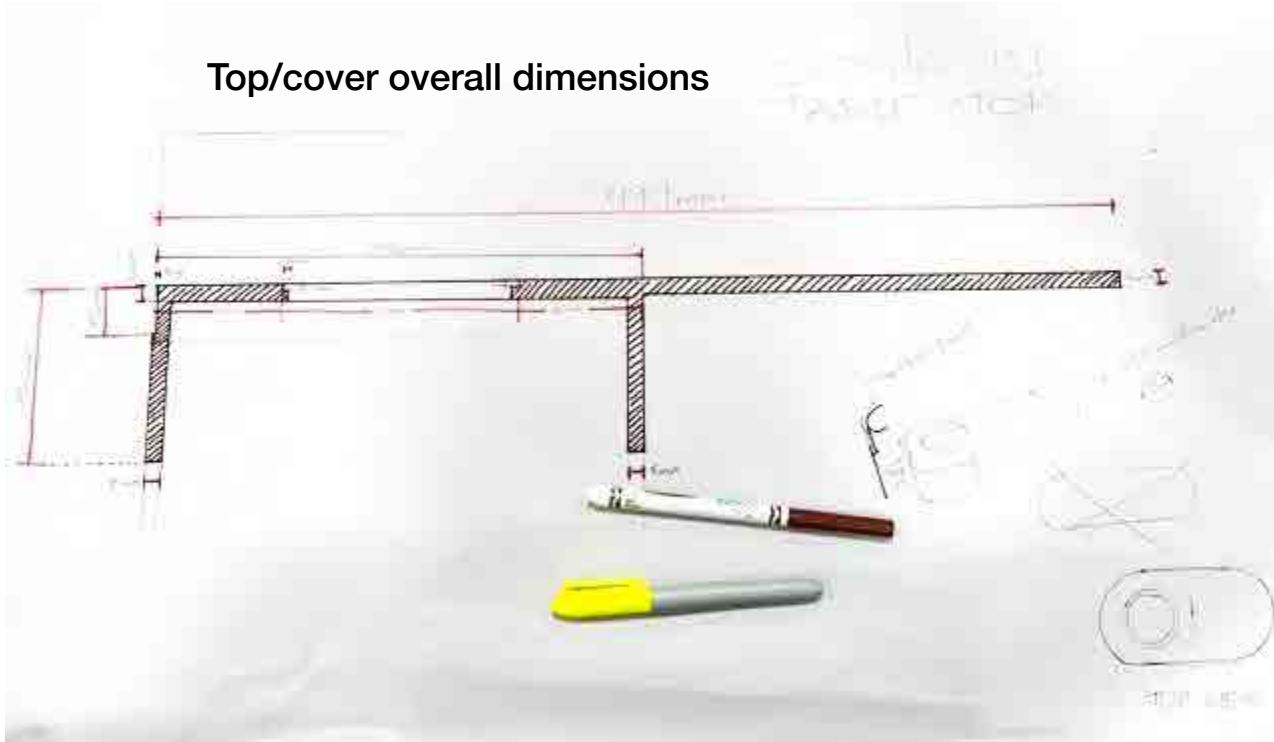
Electronic Housing and top dimensions





# PROTOTYPE DEVELOPMENT

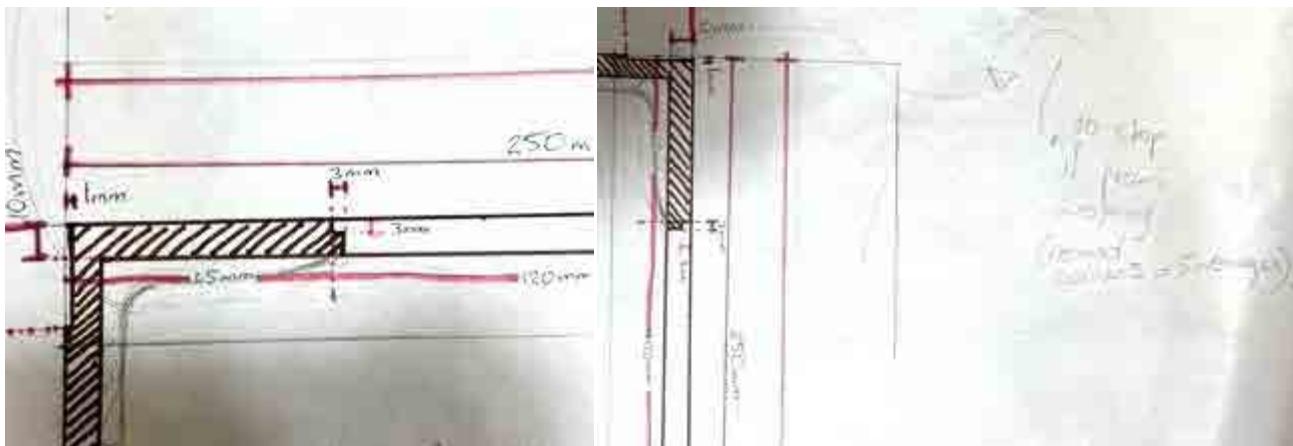
Top/cover overall dimensions



Chosen material and color (wood and keep natural color).



CHANGES:  
-Rounded inside corners to increase strength to the part



# PROTOTYPE DEVELOPMENT

## TOP COVER DESIGN CHANGES (improving aesthetics)

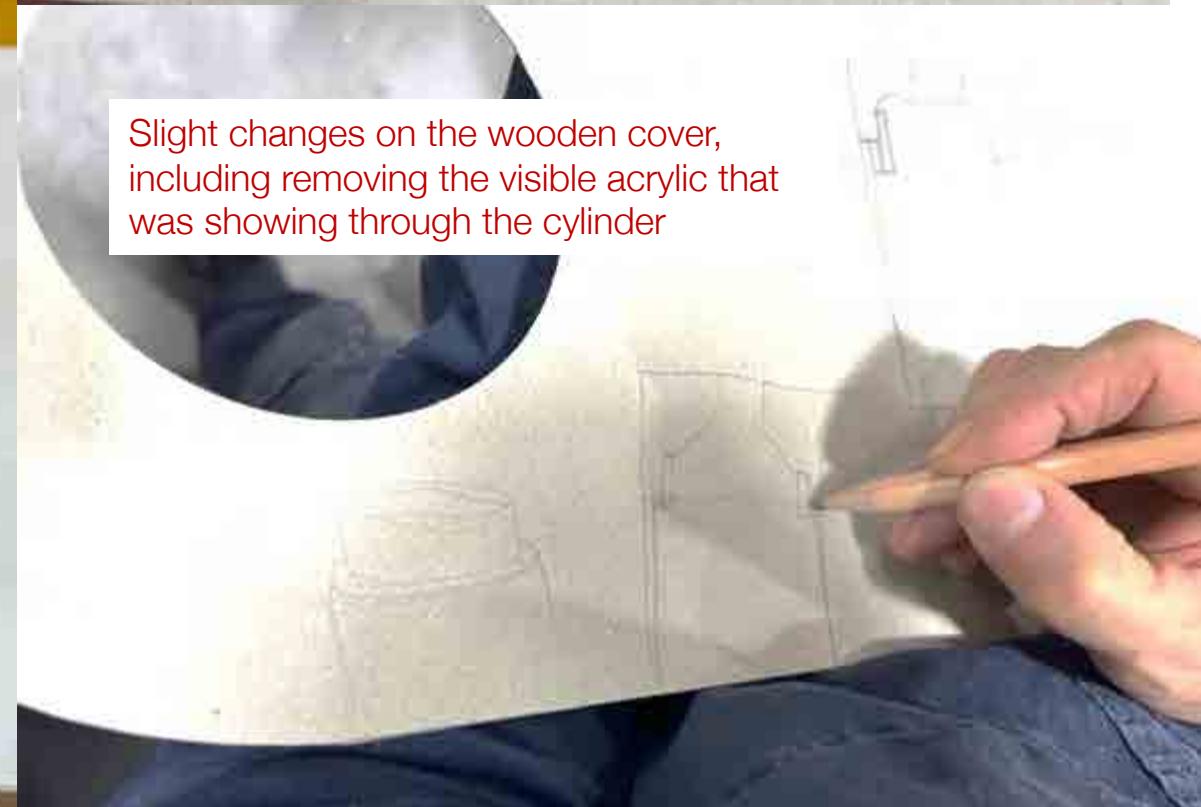
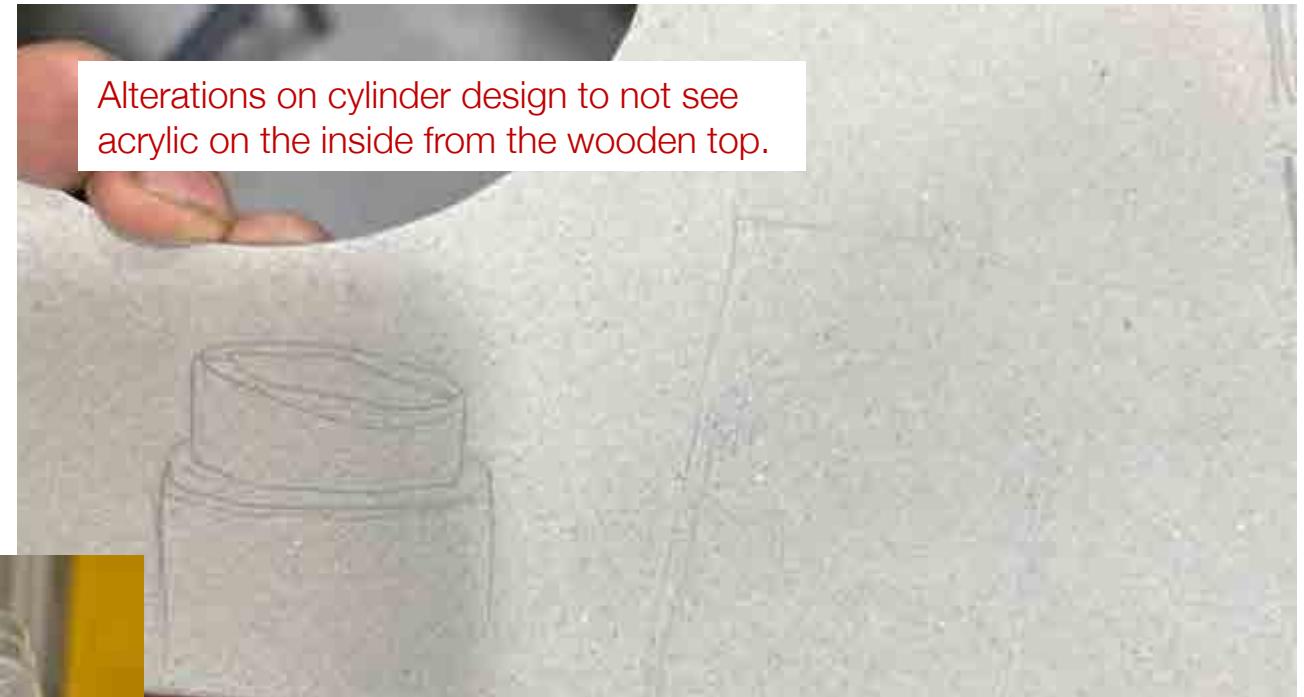
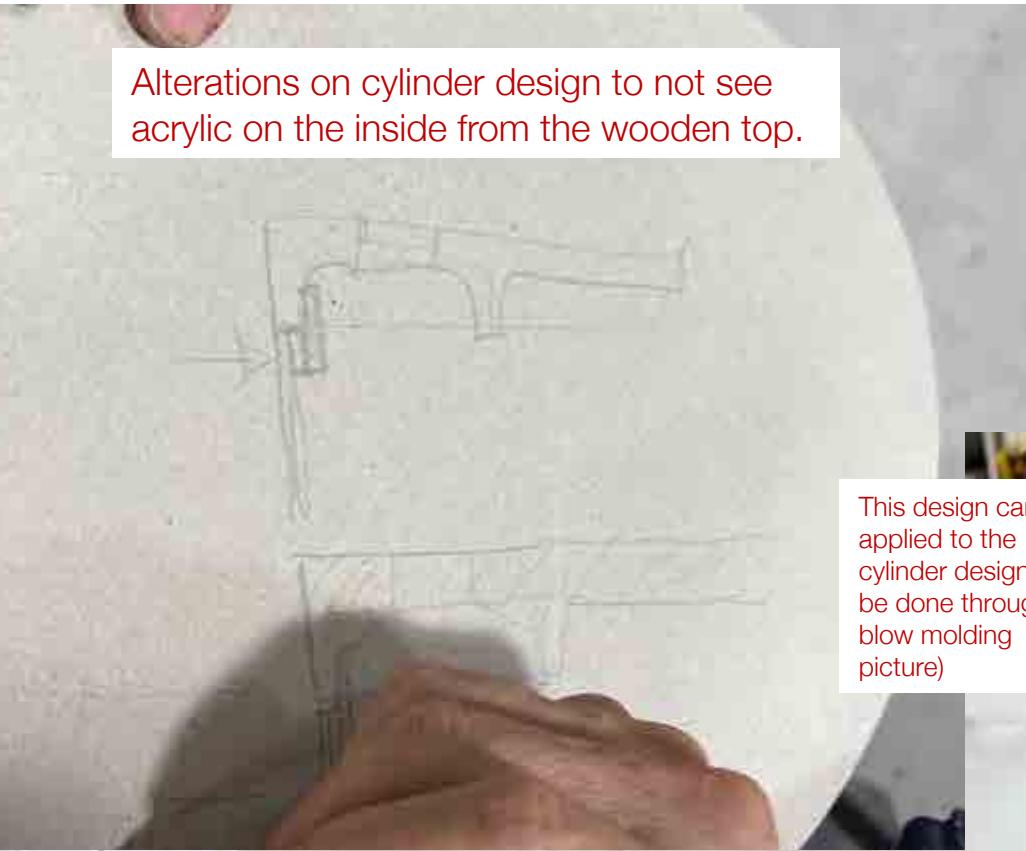
Alterations on cylinder design to not see acrylic on the inside from the wooden top.

Alterations on cylinder design to not see acrylic on the inside from the wooden top.

This design can be applied to the cylinder design and be done through blow molding (right picture)

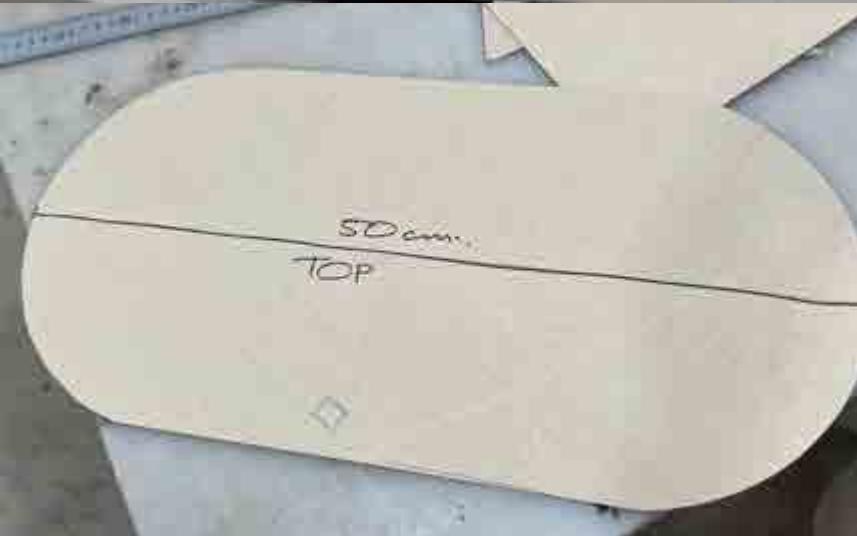
Slight changes on the wooden cover, including removing the visible acrylic that was showing through the cylinder

Potential manufacturing process for the large cylinder – Blow molding (cost effective, less parts needed)



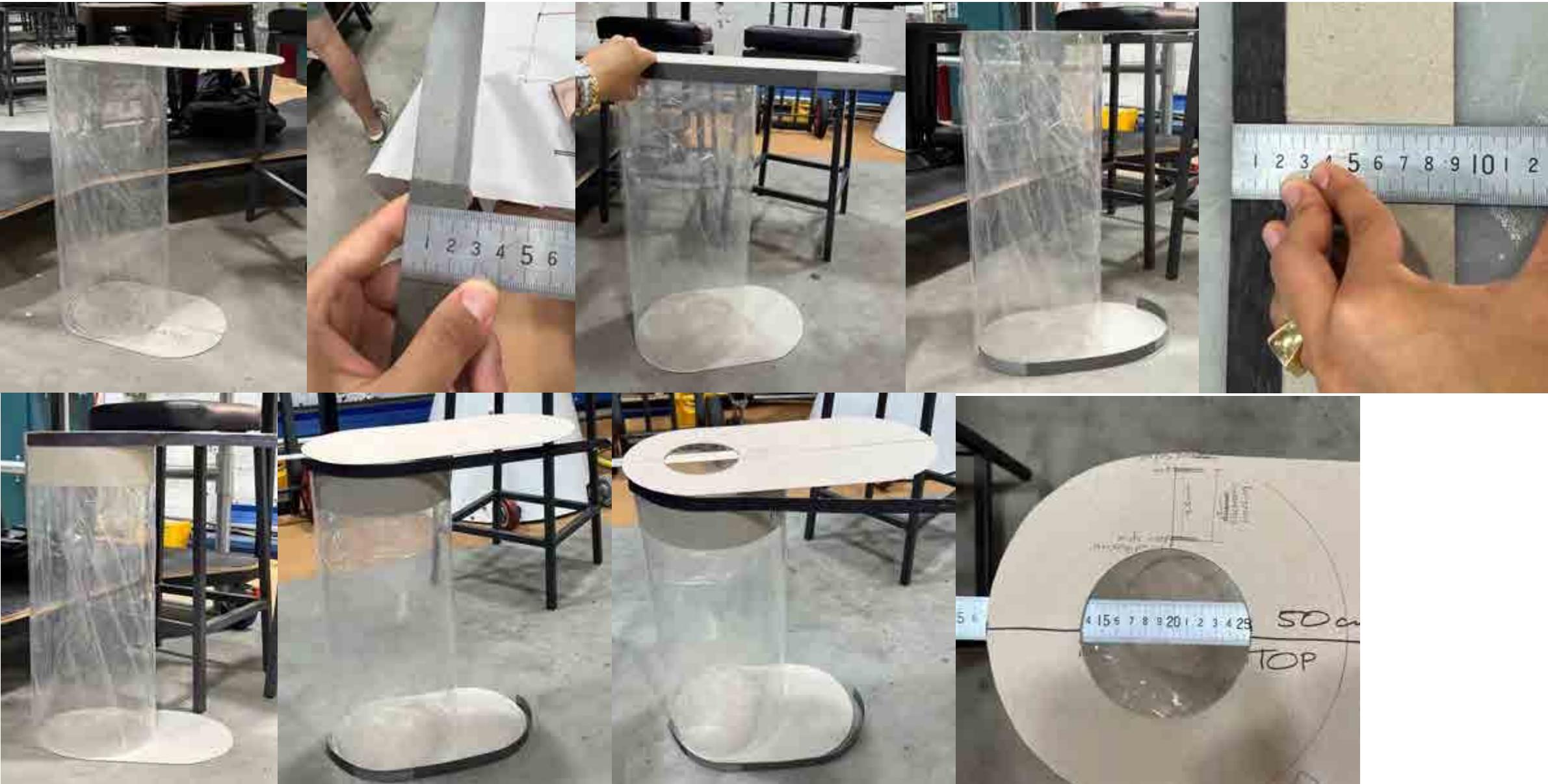
# PROTOTYPE DEVELOPMENT

PLANNING AND RESOLVING DESIGN DETAILS FOR FINAL PROTOTYPE



# PROTOTYPE DEVELOPMENT

PLANNING AND RESOLVING DESIGN DETAILS FOR FINAL PROTOTYPE



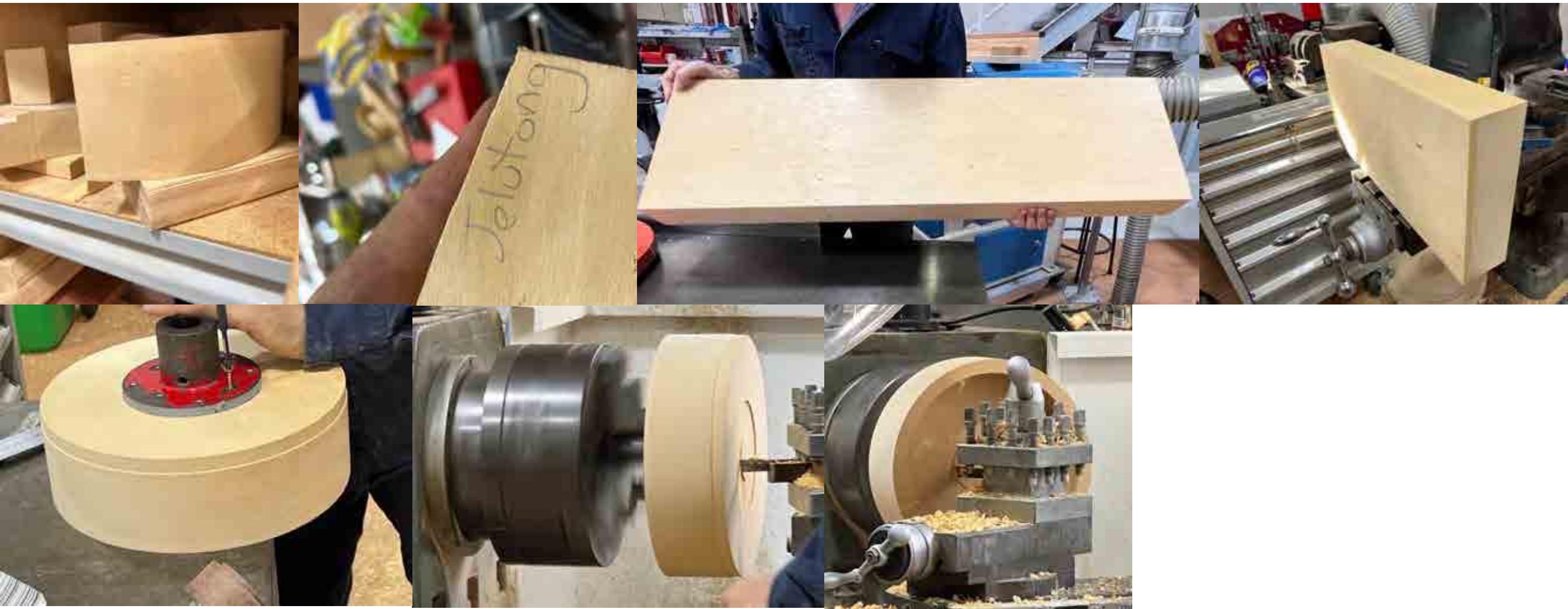
# PROTOTYPE DEVELOPMENT

MAKING METAL BAND FEATURE FOR TOP AND BASE



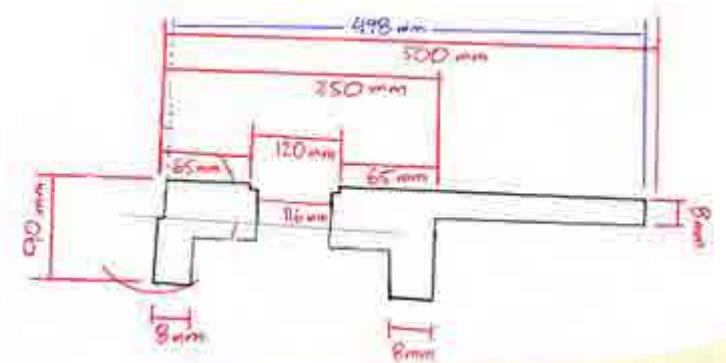
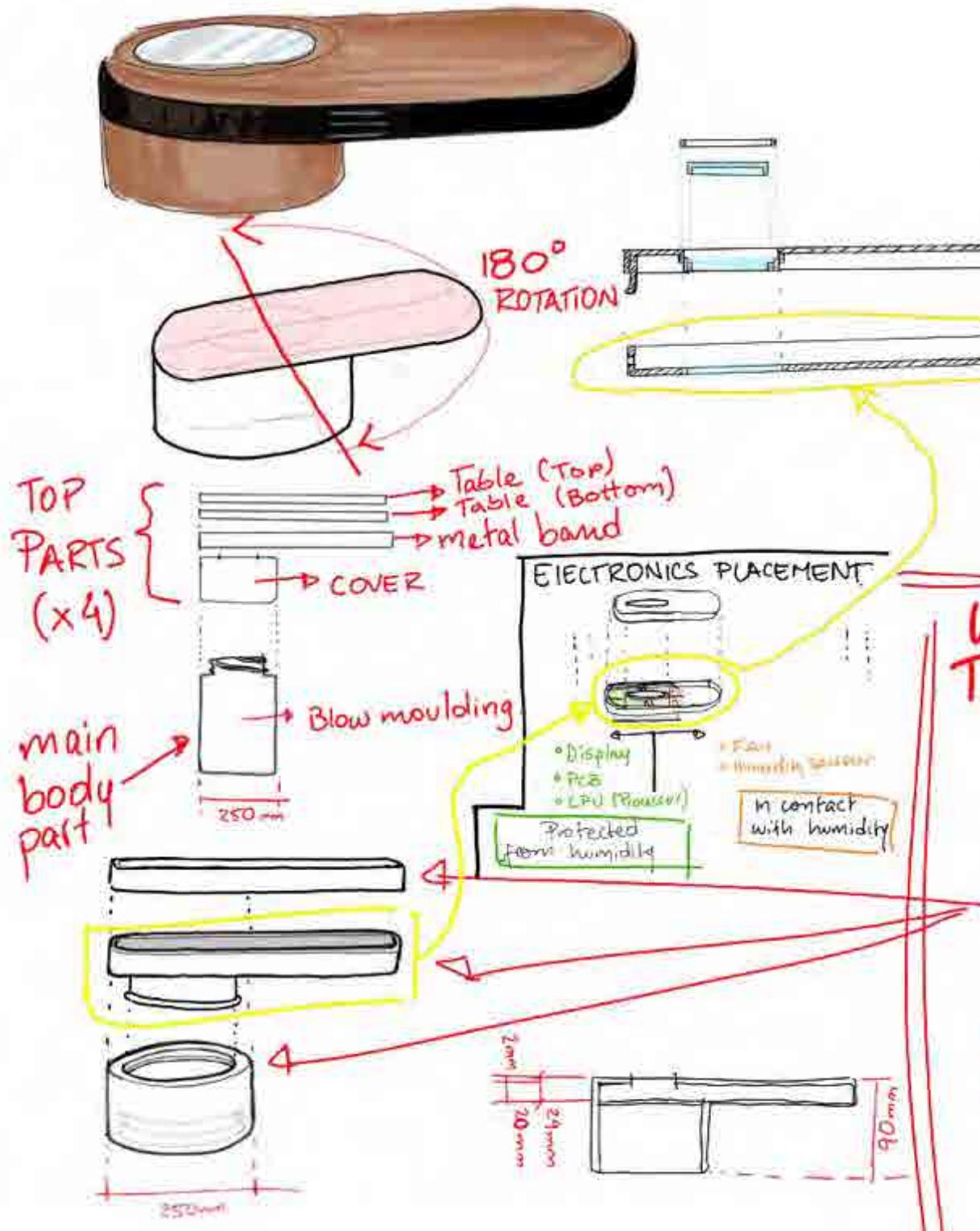
# PROTOTYPE DEVELOPMENT

MAKING TOP COVER FOR FINAL PROTOTYPE



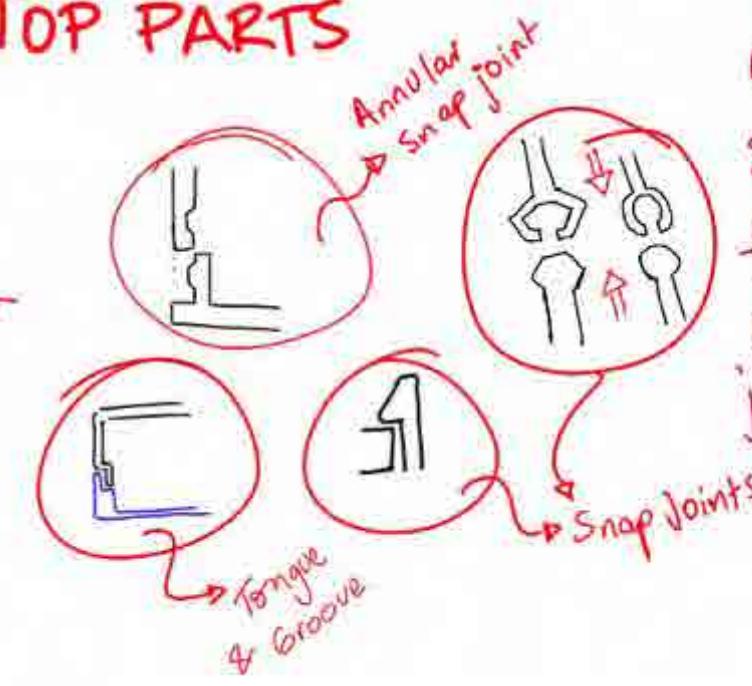
# DESIGN DEVELOPMENT

ELECTRONICS housing design and electronics arrangement



WHERE THE ELECTRONICS SIT

## WAYS TO JOIN TOP PARTS

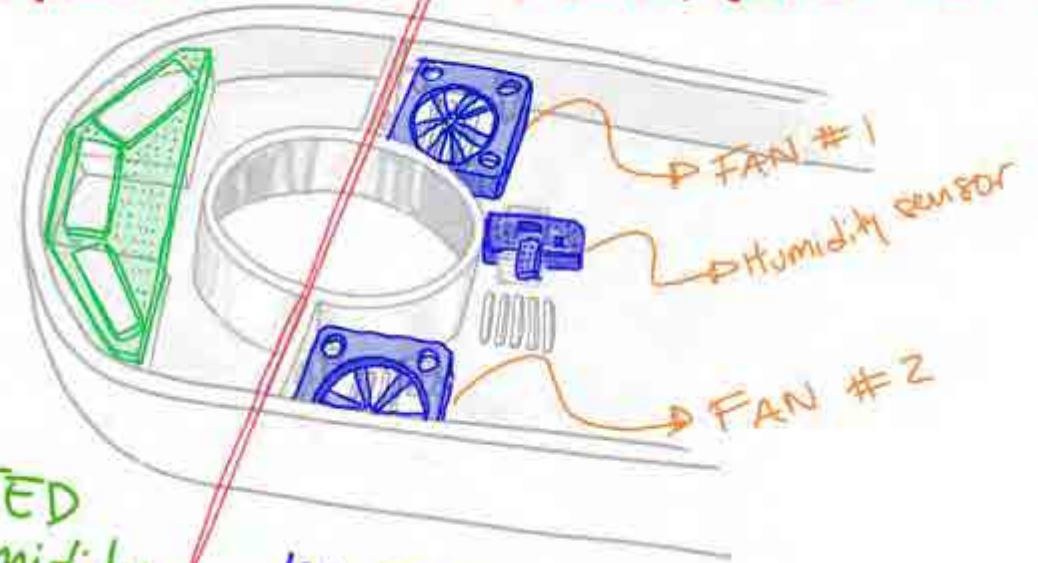
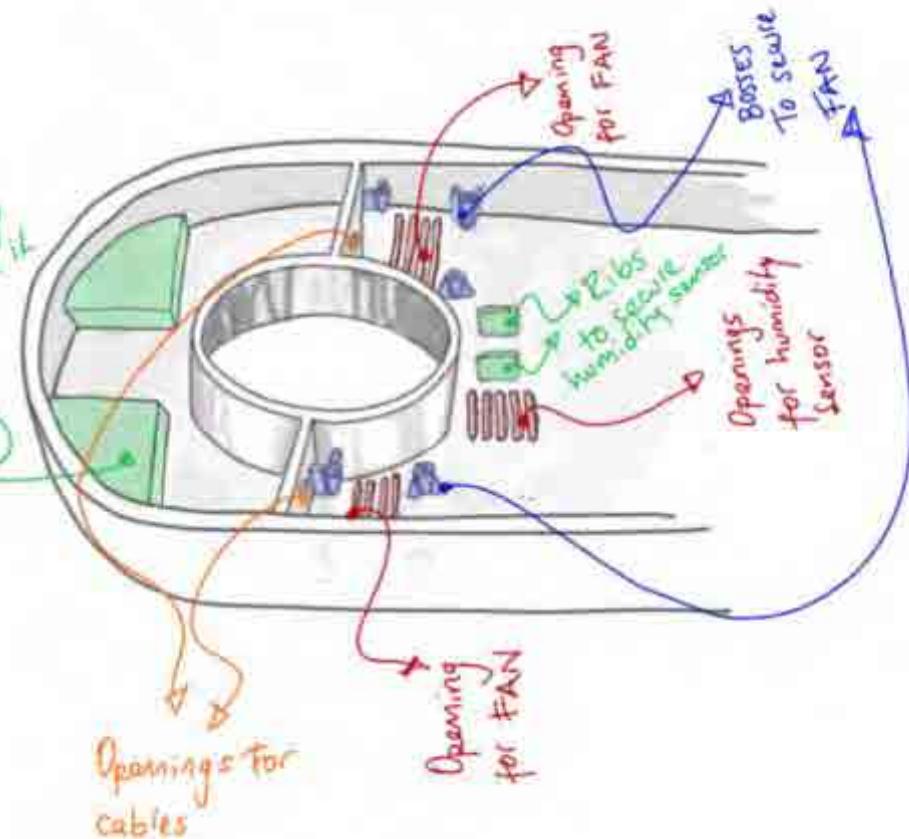
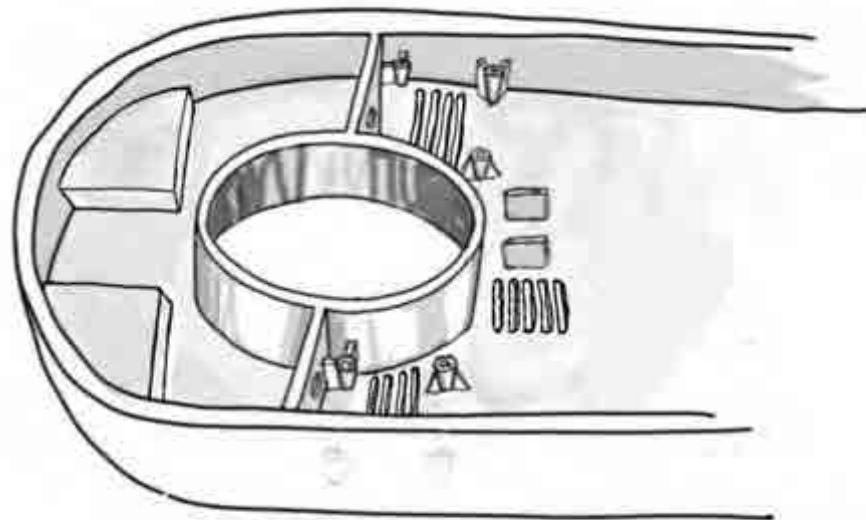


Use a combination of snap joints for the top cover with permanent joints.

# DESIGN DEVELOPMENT

ELECTRONICS housing design and electronics arrangement<sup>+</sup>

## ELECTRONICS ARRANGEMENT



PROTECTED from humidity (enclosed)

IN CONTACT with humidity. (openings)

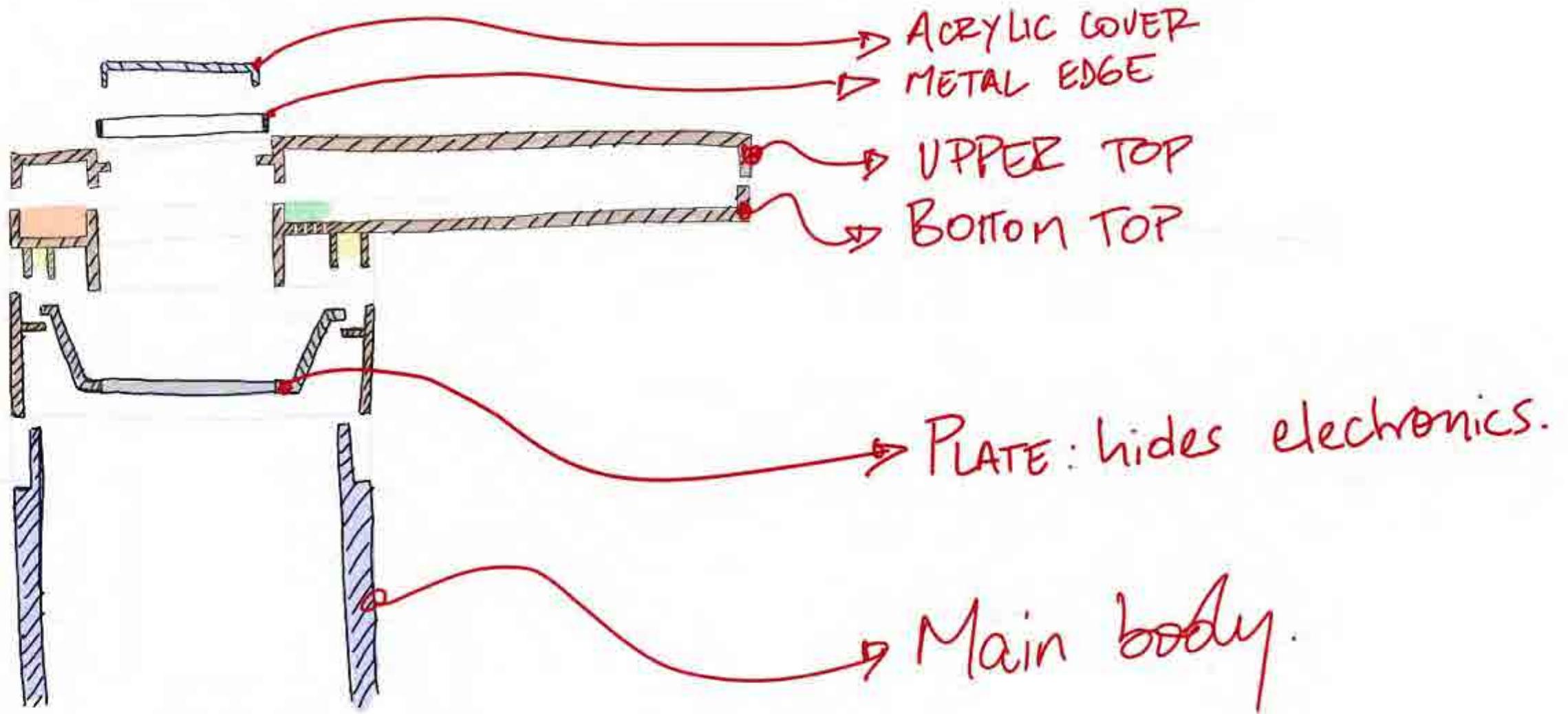
- FANS (x2) (screwed to part)



- Humidity sensor (position & secured through ribs)

# DESIGN DEVELOPMENT

PARTS design and assembly



ORANGE: Electronics protected from humidity  
GREEN: Electronics in contact with humidity  
YELLOW: light strip

# PROTOTYPE DEVELOPMENT

## LEFT TO DO

### FINAL PROTOTYPE PLANING

#### TOP

- SAND  cut some off the acrylic cover / plate for table opening
- ATTACH ACRYLIC PLATE & METAL BAND (opening)
- OPEN HOLE FOR LIGHT POWER CORD
- BUY WATER BASE SEAL (Bunnings) & SEAL IT
- ATTACH BAND EDGE
- PROTECT INSIDE FROM HUMIDITY
- CREATE & ATTACH ACRYLIC PROTECTION FOR LIGHT STRIPS (attach to inside of wooden top)

### TO DO!!!

#### METAL BANDS

- CUT NEW BAND FOR OPENING, SAND IT & PAINT & WELD IT
- WELD ALL BANDS (TOP & BOTTOM)
- SAND BOTH BANDS & TOP opening
- PAINT BANDS
- CUT, SAND & WELD BASE FOR BOTTOM BAND

#### BASE

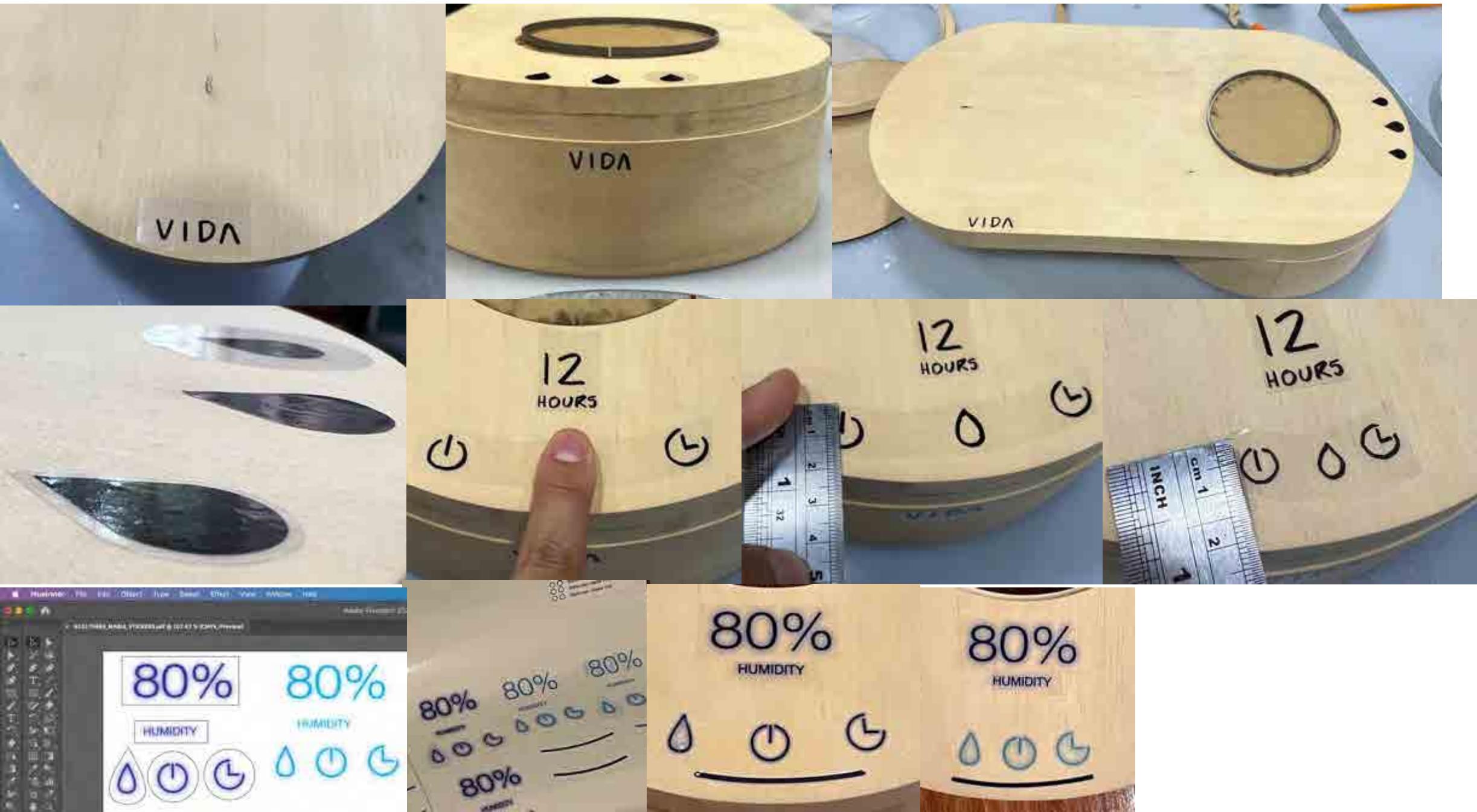
- CUT ACRYLIC & ATTACH IT TO MDF BASE
- CUT MDF, SAND IT & ~~PAINT~~ PAINT IT & PASTE IT ON ACRYLIC
- GIVE ENTIRE BASE (ACRYLIC & MDF) TO MAIN BODY.

#### DETAILS/OTHER

- DO STICKERS ON ILLUSTRATION TOP & SEND IT
- Create decals for metal band on either side
- Create template for openings for the underside of the table (air circulation)

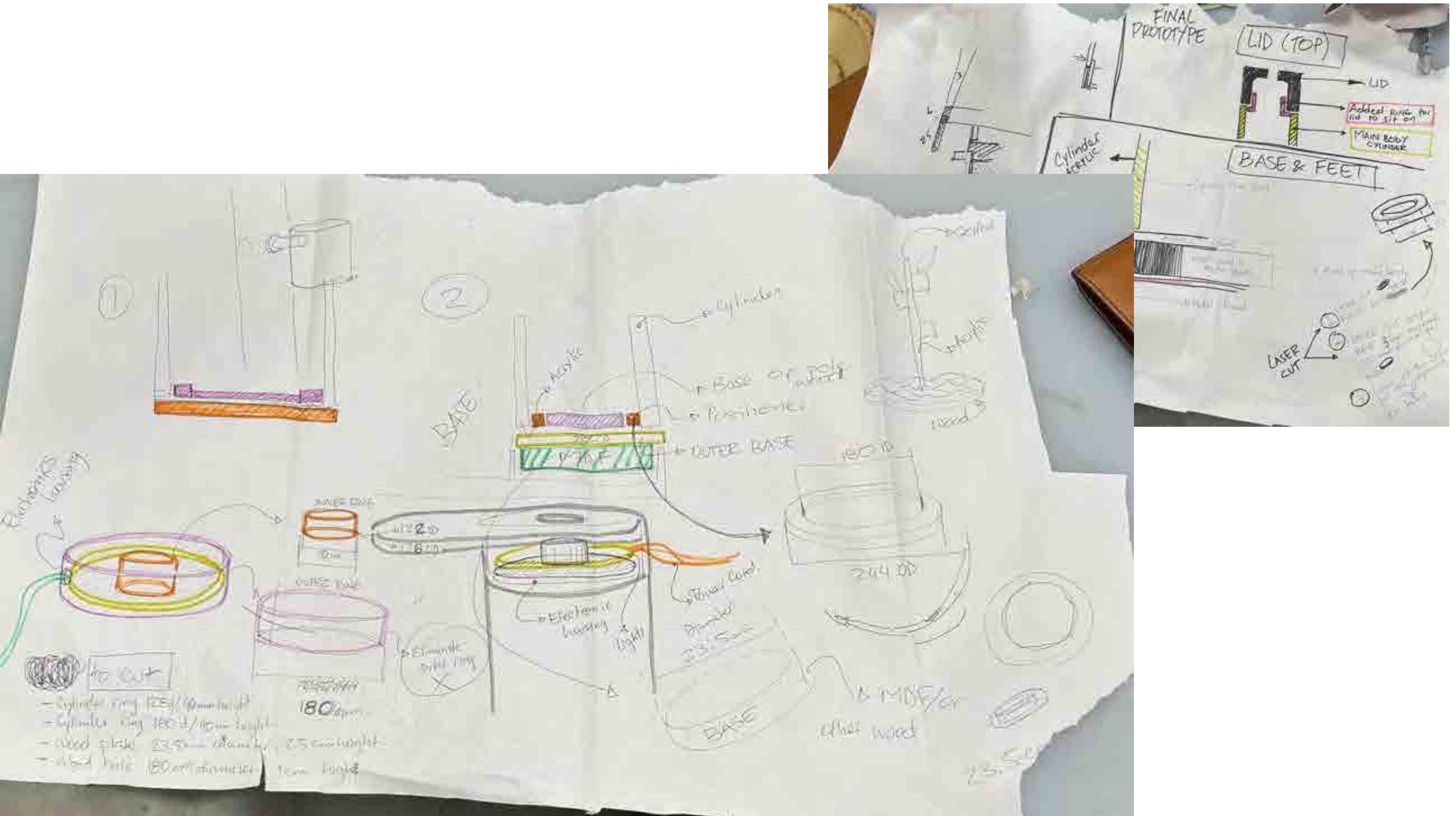
# PROTOTYPE DEVELOPMENT

## DIGITAL DISPLAY AND BRANDING



# PROTOTYPE DEVELOPMENT

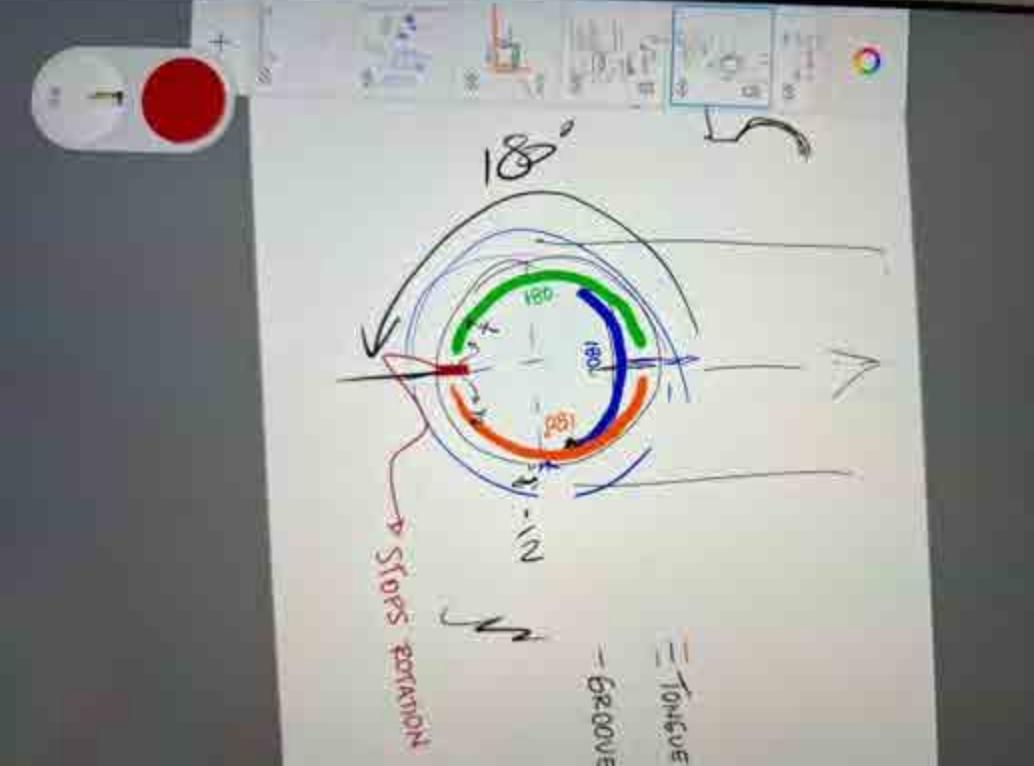
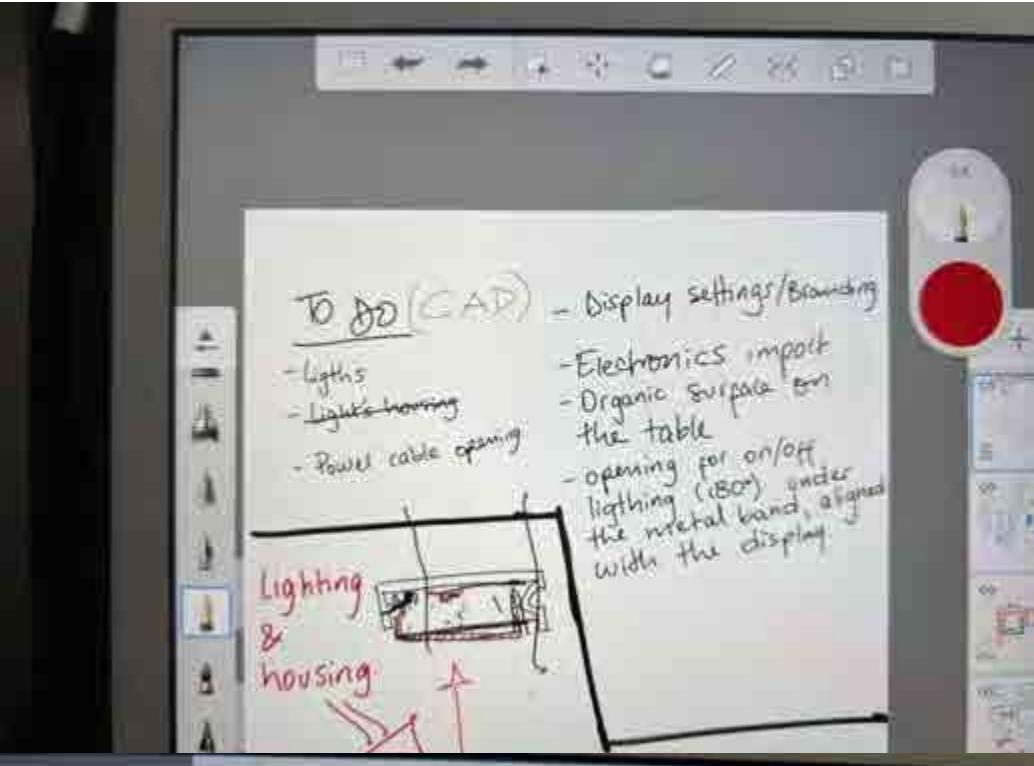
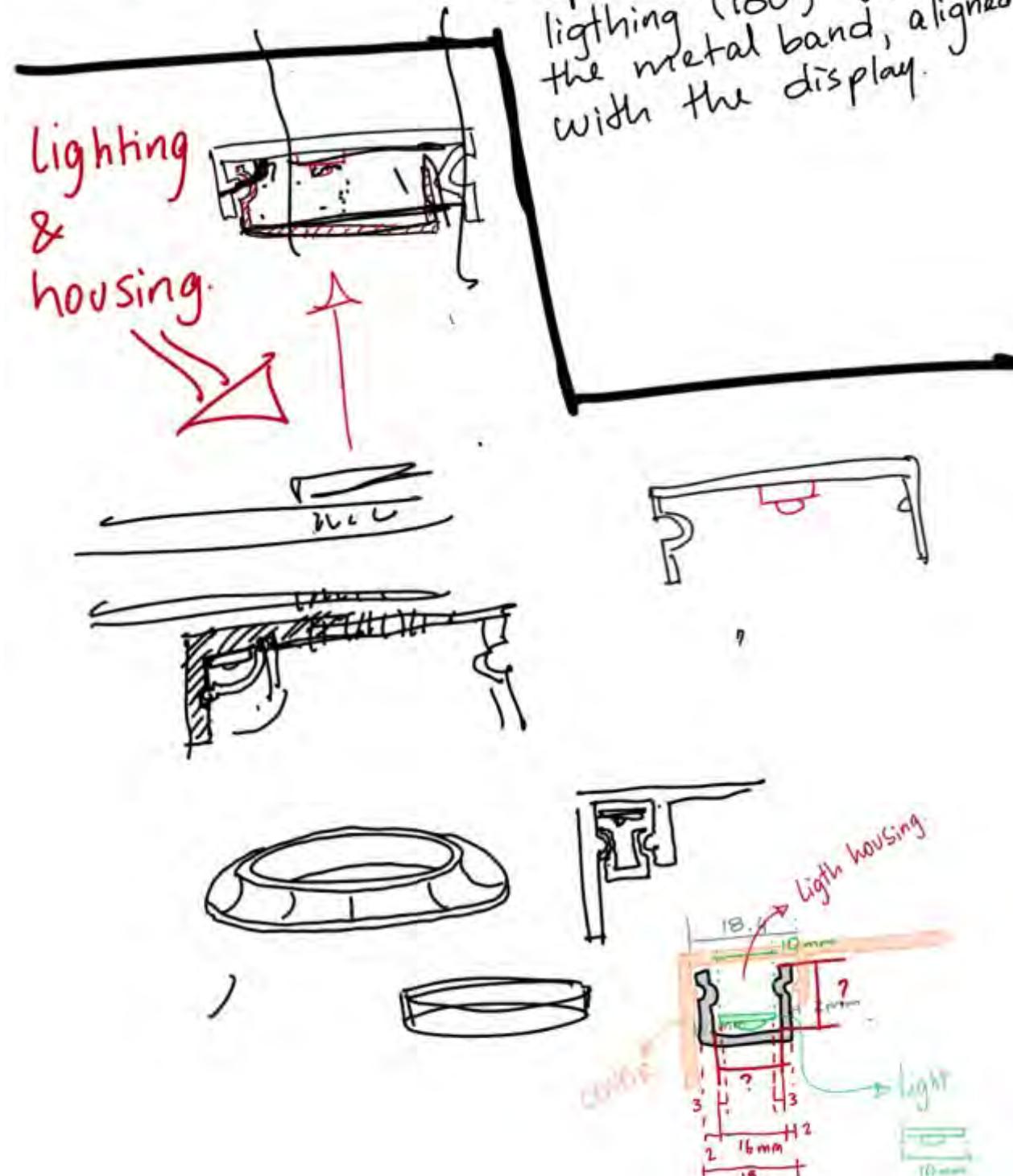
## DETAILS



# DESIGN DEVELOPMENT

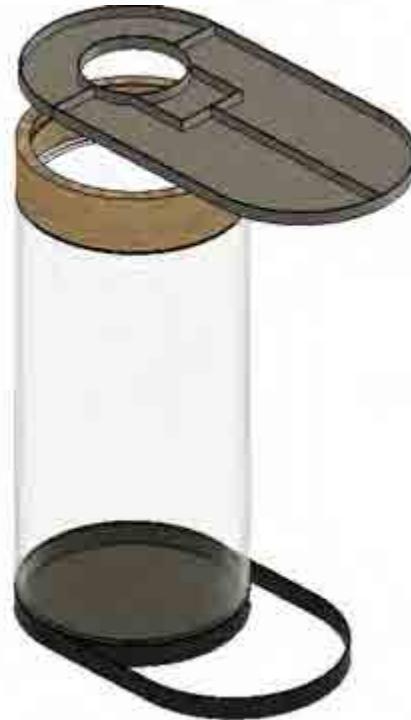
CAD

- TO DO (CAD)
- Display settings/Branding
  - Electronics import
  - Organic surface on the table
  - opening for on/off lighting (180°) under the metal band, aligned with the display.
  - Lights
  - ~~Light's housing~~
  - Power cable opening



# DESIGN DEVELOPMENT

CAD



# DESIGN DEVELOPMENT

CAD



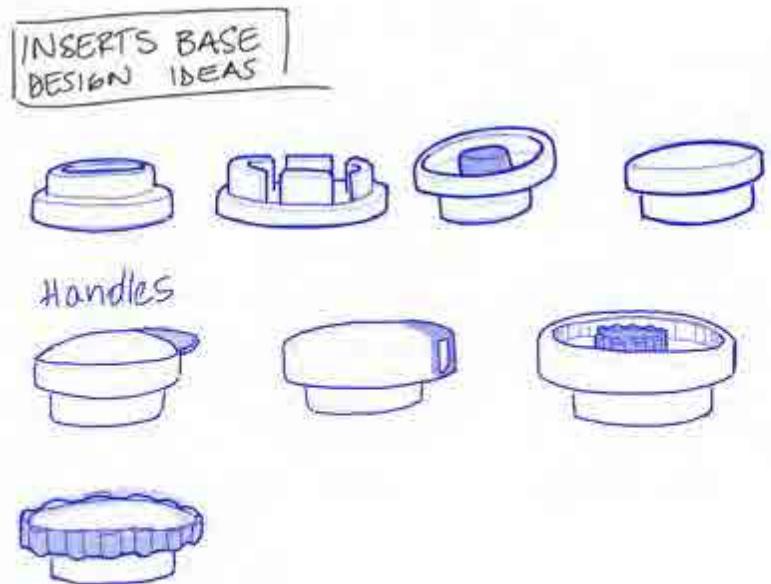
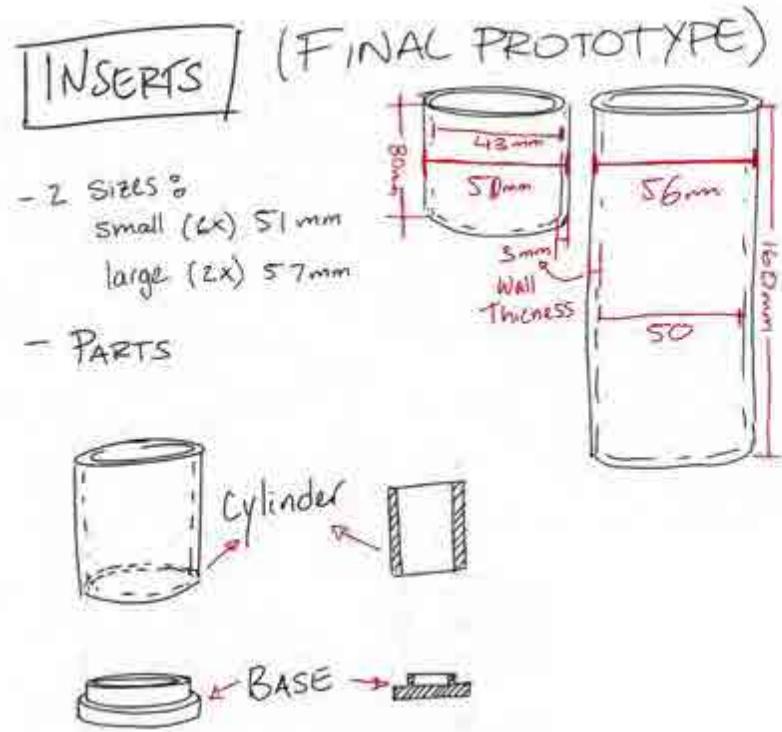
# DESIGN DEVELOPMENT

CAD



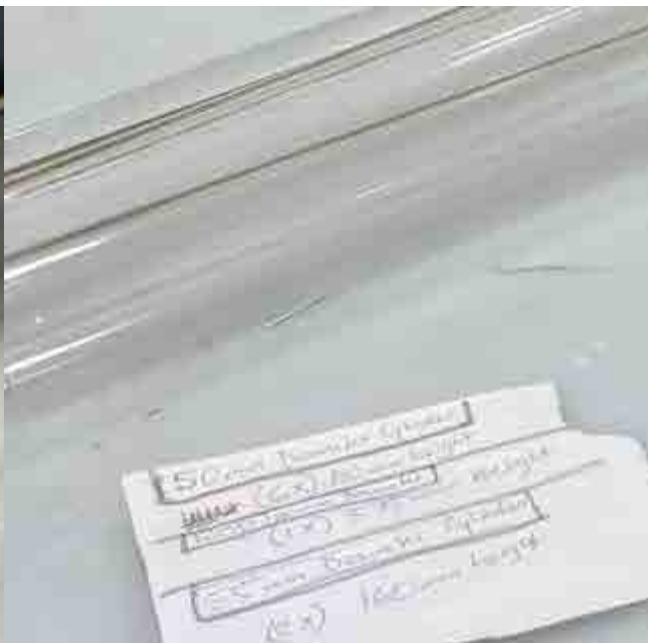
# PROTOTYPE DEVELOPMENT

CAD (Inserts base)



# PROTOTYPE DEVELOPMENT

## INSERTS AND POLE



150mm diameter cup  
100mm (4x) 100mm length  
150mm diameter cup  
100mm (4x) 100mm length

# PROTOTYPE DEVELOPMENT

AIR CIRCULATION OPENINGS AND INSERTS BASE PATTERNS



# FINAL PROTOTYPE

## FINAL PROTOTYPE PROCESS



# FINAL RENDERS

FINAL DESIGN RENDERS



# FINAL PROTOTYPE

PROTOTYPE AND CONTEXT



# PROTOTYPE USER EXPERIENCE PHOTOS

## HOME ENVIRONMENTS



# PROTOTYPE CONTEXT PHOTOS

## HOME ENVIRONMENTS

