





**TENTO**



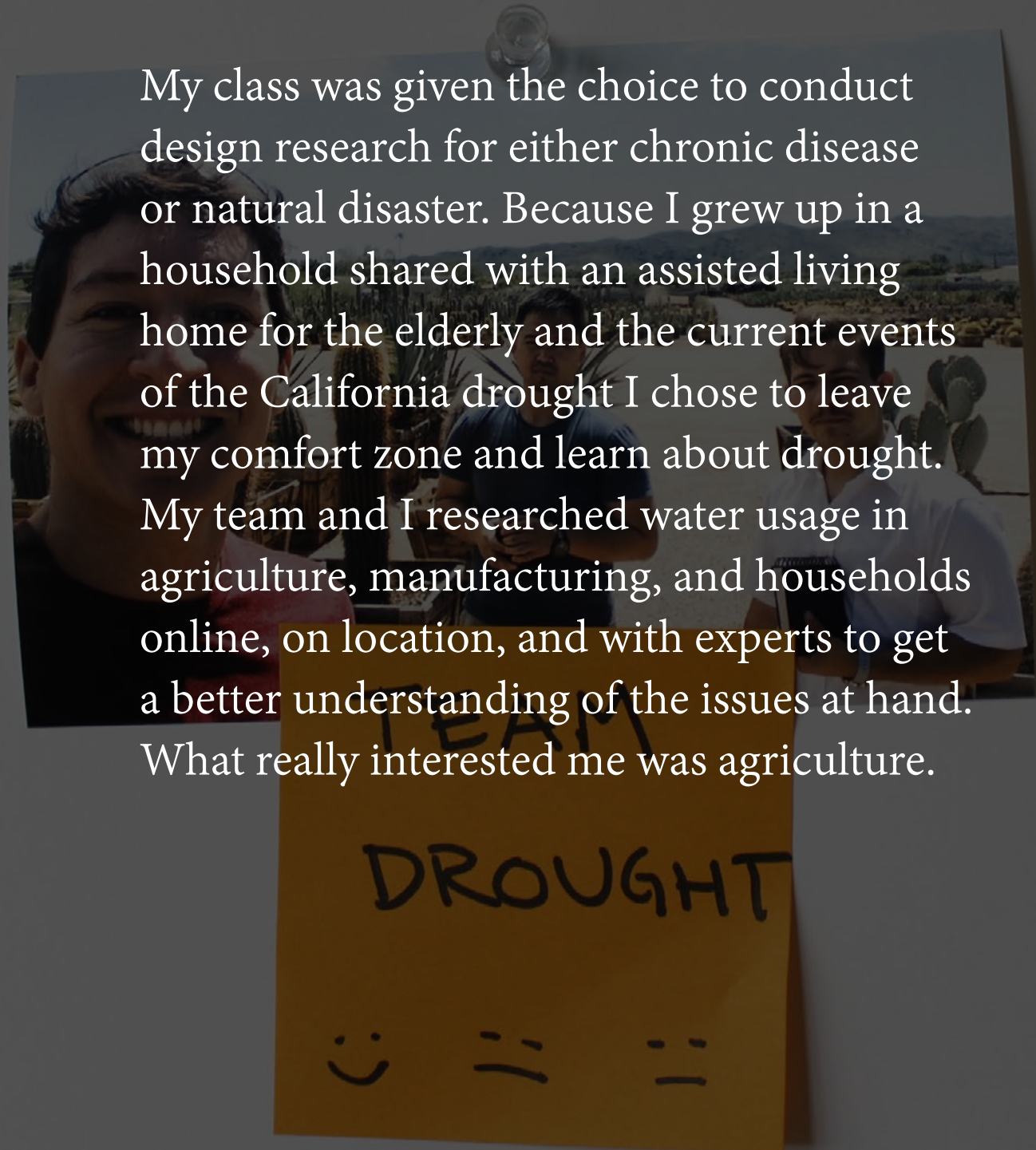
TEAM

DROUGHT



# Research

My class was given the choice to conduct design research for either chronic disease or natural disaster. Because I grew up in a household shared with an assisted living home for the elderly and the current events of the California drought I chose to leave my comfort zone and learn about drought. My team and I researched water usage in agriculture, manufacturing, and households online, on location, and with experts to get a better understanding of the issues at hand. What really interested me was agriculture.





8,350

1,250

8

How many gallons of water it takes to produce 1 Kilo of protein.

A close-up photograph of a green katydid insect resting on a leaf. The insect is the central focus, with its long antennae and legs visible. The background is a soft-focus green, suggesting a natural outdoor setting. The text is overlaid on the right side of the image.

## Research

Insects are a unique food to about 2 billion people around the world in the Americas, Africa, Asia, Australia and New Zealand. It is theorized that European ancestors did not farm them and popularize entomophagy (the consumption of insects) because of the ease of which larger mammals could be handled and the added benefits (i.e. fur, wool, transportation, etc.), but in the current world with its synthetic materials and the need for smart, sustainable food why not eat insects?



# Opportunity

It is possible for foreign foods like insects to take hold of the market when foods like sushi (primarily raw fish- which was not a part of the cultural diet in the U.S. 40 years ago) have done so. Sushi gained its popularity in Los Angeles, CA when it became a popular item for celebrities and the influential. Since then the demand has boomed into a global phenomenon.



# Opportunity

In today's U.S. market there are very few companies producing crickets for human consumption, or entomophagy related products. Those that do exist, therefore, are able to turn a profit because the growing demand outweighs the market supply. One of the most popular forms of entomophological goods is that of cricket powder, a form of high protein, high iron, and low fat powder that can be added to various foods to increase the nutritional value. This trend is still new and has ample room for growth and design opportunities.





# Target Audience

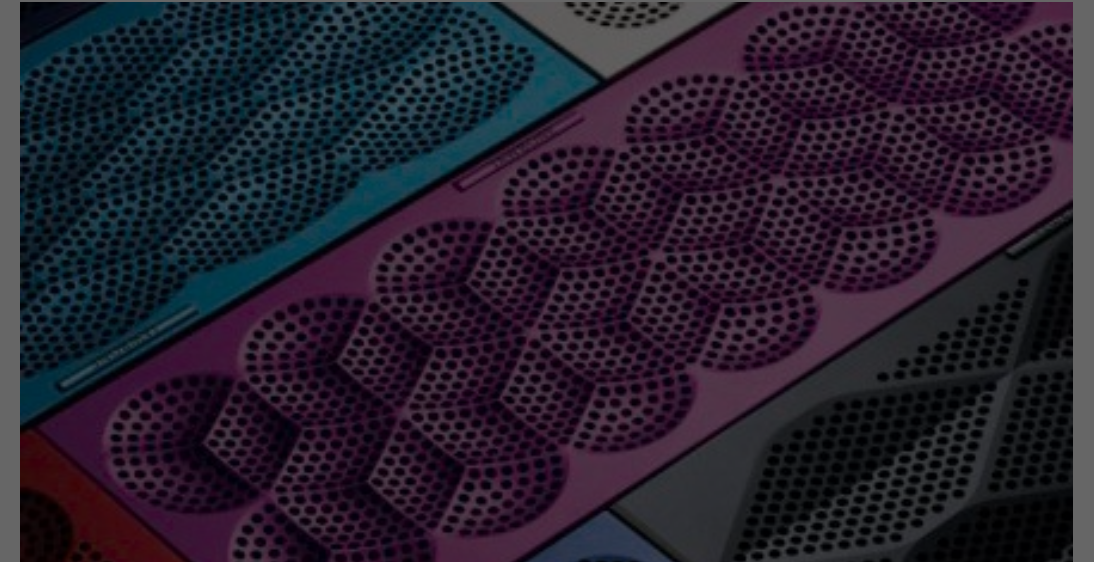
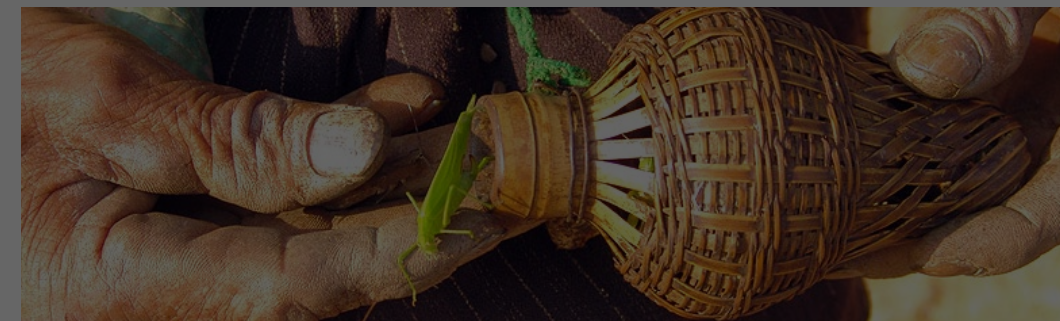
The target audience chosen with the ability to help this trend grow and become the norm would be the Millennials. Studies show this generation is more willing to pay for consumer goods with ecologically responsible impacts. More specifically the innovators and early adopters would be the 'urban farmers' and 'foodies' - those concerned with aspects of food such as its origins, sustainability, and health benefits.

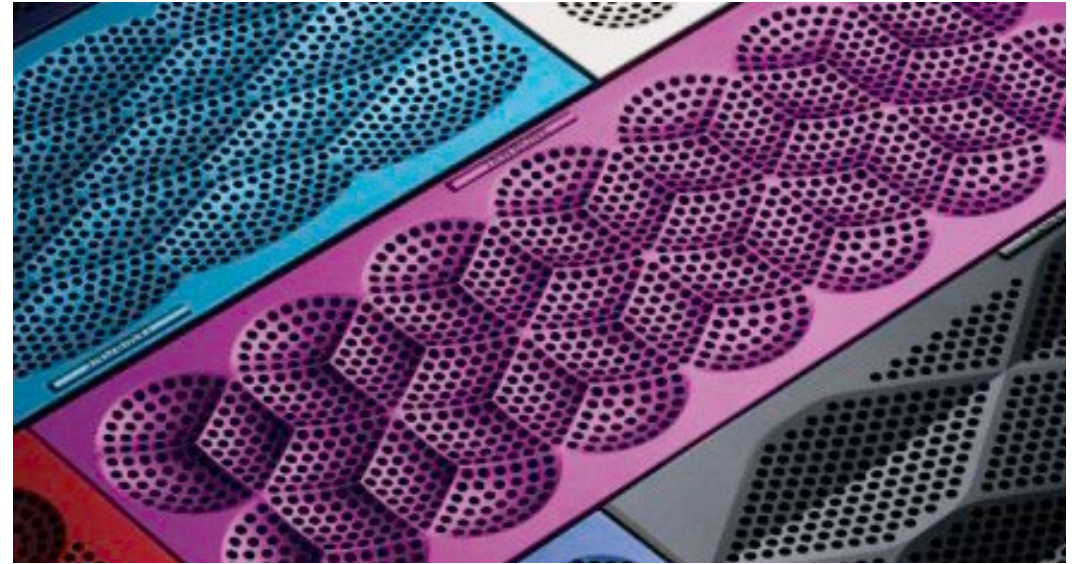


# Traditionally Modern



The design identity of Tento is inspired by the cultural identity of people that practice entomophagy (e.g. Vietnamese, Japanese, African, and Mexican influences) and nature, but with current technology in manufacturing and materiality in mind. This theme feels natural yet sophisticated.





# Notes/Insights

## FIND THE RIGHT TARGET AUDIENCE

- FOODIES\*
- THE "INNOVATORS"
- EARLY ADOPTORS
- COOL KIDS
- THE DARING ONES

YOUNG CONSUMERS THEY DON'T HAVE AS ESTABLISHED STIGMAS

INTERVIEW THEM + POSSIBLY FOLLOW UP PEOPLE (THOSE WHO GENERALLY FOLLOW THE INNOVATORS)

DEVELOP POV, HYPOTHESIS, + ASSUMPTIONS

## DISCUSSION GUIDE QUESTIONS

- WHO EATS/BUYS YOUR PRODUCT?
- WHAT CITY/CULTURAL BACKGROUND/ INCOME LEVEL/ TEND TO BUY YOUR PRODUCT
- HOW DO THESE PEOPLE HEAR ABOUT/BECOME AWARE OF YOUR PRODUCT AND THEN DECIDE TO PURCHASE EDIBLE INSECTS?
- WHO REGULATES ~~THE~~ PRODUCT QUALITY

## QUESTIONS FOR NATHAN ALLAN COMMENTS

- YOU MENTIONED INSECTS ARE ENDOHERM, DURING BIRTH-UP RESEARCH I FOUND THEY'RE ECTOTHERM (ECTOTHERMS) & ENDOHERMS
- ECTOTHERM IS AN ADAPTIVE STRATEGY THE COMMON IN WHICH THEY IS GIVEN UP

GRASSHOPPERS (LOCUST): Adults 1/2 in long newly hatched nymphs are wingless, smaller + feed voraciously favorite substrates (locust seasons)

Management difficulty: hand-pick, use floating row covers if grasshoppers migrating in an exposed or bare area. problem a previous years, consider applying to uncultivated border vegetation a carbaryl bait or try the biological control ~~the~~ *Nabona lewisi*. Mobility restricts effectiveness of pest insecticides.

(pg. 729) *The New Sunset Western Garden Book: the ultimate gardening guide*

David Morgan *Grasshopper* Preface  
 they move beyond 8 insects  
 direct from their  
 the one in Bay Area live about a week on the  
 every day they are a cloud  
 they get very dirty  
 they are voracious eaters + they are  
 through and dirty they are vicious  
 in destruction they are  
 common but on the fields for  
 cucumbers +  
 they look better

who has Jordan of palace surrounding  
 - Shalika (1st of his kings)  
 they are a week war + are not  
 specialized at all (1st king)  
 it is similar with the words of  
 the world  
 - Sir David Attenborough

## entomophagy

little herbers  
 more (cruel farm)  
 all over country salt  
 SF open big farms (open market + diy)

edible bugs *big muscle* sick *arizona*

little birds  
 not for profit  
 Enviroflight  
 sold in ohio

agroprotein A  
 sixth strain  
*didn't arrive*  
 with

YELL

short-term to long-term

~~the~~ might insects  
 0 of Wisconsin  
 micro-farming units

aspire  
*F*ickets  
 modular kitchen  
 CC enviro  
 6 weeks hatch 2 harvest  
 organic blended diet  
 water changed daily  
 powdered + whole

micro-industrial  
 black culture fly larvae  
 moisture from feed they eat  
 + vegetable waste

## NOTES w NATHAN

Custom blend organic feed

Standardization is an issue that needs to be looked into

monitored diet

hopball first farm to be sustainable

not viable

standard product (know what to expect)

flavored balanced diet  
 nutritional balanced diet  
 common 20W

SD NEW

EFFICIENTLY + RESPONSIBLY

is sustainable

"TRAVEL WELL"

micro-farming year-round sustainably not just seasonal

food source within weeks

empower communities around the world

DESIGN

MEANS

government subsidies (other companies have them)

## NOTES w NATHAN ALLAN

product masses  
 cooking, pasta sauce

Paleo - gluten free  
 very healthy, sustainable

FOODPRINT +

home

production since August  
 aspirin demand

densely populated urban areas

Waste Audit + MEDICAL in population

ASIAN - DIETARY  
 DENVER, CO - NY

Reverse osmosis water  
*Removal* collection  
 reduce heavy footprint

exothermic

what do they feed on?

how much water a year/month do they need?

do insects drink water or absorb it through skin?

where do you get feed to feed insects in farm?

what kind of facilities (farm) are they growing at? Lab? Field? Farm?

who currently buys insects for human consumption?

who is your target audience? who would you like to get to eat insects?

do you breed insects for taste/scent/resistance to drought?

what are insect-based products?

how much space do you require?

what substrates do insects require?

insects (grasshoppers, crickets etc) are very high in protein, but what nutrients do they lack?

what fields can you find these substrates in?

how do you measure the insects for diseases, especially when they're so small?

what is your long-term vision? what are the important issues here like?

what are the health regulators and regulations you abide by?

ROBERT NATHAN ALLEN  
 Little Herbs

CONTACT BAJA @ (504) 378-5196

5905  
 Oak  
 Baby



can't see  
~~insect~~

Big or why protein

vitamin A + C deficient  
 complete protein  
 + amino acids

Custom TAILORED DIET! informed on

Small of fish for used for feeding  
 fish oil  
 fish meal

don't eat anything that eats synthetic feed

SAFETY + QUALITY

page on why insects all over the world

ENTOMOPHAGIST

ENTOMOLOGIST

○ NUTRITIONIST

○ COMEDIAN

○ LIVESTOCK FARMER

○ CHEF

○ FOOD CRITIC

~~○ PET STORE~~ ✓

○ MOVIE PROP

## INSIGHTS

INSIGHTS FOUND THROUGH STUDY MODELLING + RESEARCH

- CRICKETS NEED SMOOTH + ROUGH SURFACES TO DETER + ENCOVERAGE 'DC' AREAS, RESPECTIVELY
- PUTTING FRESH FOOD (I.E. CUCUMBERS + LEMON GRASS) PROMOTES THEM w/ WATER TOO, BUT IT ROTTS QUICKLY, ESPECIALLY w/o VENTILATION TO COOL DOWN DARK, HOT, MOIST ENVIRONMENT (PERFECT FOR MOLD)
- YOU NEED TO BE ABLE TO QUICKLY CLEAN OUT FOOD, WATER, FECES, DEAD w/o LETTING CRICKETS ESCAPE.
- ESCAPE IS NO-GOOD, ESPECIALLY WHEN NON-NATIVE SPECIES!
- HARVESTING CRICKETS (or other insects) NEEDS TO BE QUICK, SIMPLE, AND NOT ALLOW ESCAPE.
- CRICKETS NEED ROOM TO BREED, ESPECIALLY IN LARGE QUANTITIES.
- THEY CAN CLIMB ON VERTICAL SURFACES WHICH CAN DECREASE HORIZONTAL OR EVEN VOLUME USED.
- THEY SHOULD HAVE A SIMPLE, SELF-SUFFICIENT AIR/HUMIDITY/TEMP. CONTROL. PREFERABLY NO ELECTRONICS.
- THEY NEED TO HAVE A PLACE TO BREED WHEN READY.
- BREEDING GROUND NEEDS TO BE MOIST DIET (WARM + THIN).
- CRICKETS CAN BE COOLED TO A COMA LIKE STATE. OPPORTUNITY FOR EASY COLLECTIONS.

**FIND THE RIGHT TARGET AUDIENCE**

- FOODIES\*
- THE "INNOVATORS"
- EARLY ADOPTORS
- COOL KIDS
- THE DARING ONES

YOUNG CONSUMERS  
THEY DON'T HAVE  
AS ESTABLISHED  
STIGMAS

INTERVIEW THEM + POSSIBLY FOLLOW UP PEOPLE  
(THOSE WHO GENERALLY FOLLOW THE INNOVATORS)

DEVELOP POV, HYPOTHESIS, + ASSUMPTIONS

**DISCUSSION GUIDE QUESTIONS**

- WHO EATS/BUYS YOUR PRODUCT?
- WHAT CITY/CULTURAL BACKGROUND/ INCOME LEVEL/ TEND TO BUY YOUR PRODUCT
- HOW DO THESE PEOPLE HEAR ABOUT/BECOME AWARE OF YOUR PRODUCT AND THEN DECIDE TO PURCHASE EDIBLE INSECTS?
- WHO REGULATES PRODUCT QUALITY

**QUESTIONS FOR NATHAN ALLAN COMMENTS**

- YOU MENTIONED INSECTS ARE EXOTHERMIC, DURING FOLLOW-UP RESEARCH I FOUND THEY'RE ECTOTHERMIC (ECTOTHERMS) vs ENDOTHERMS
- EXOTHERMIC is an adjective describing the condition in which heat is given off

GRASSHOPPERS (LOCUST) - Adults 1-2 in long  
newly hatched nymphs are wingless, smaller + feed voraciously  
periodic outbreaks (locust seasons)

Management: difficultly hand-pick, use floating row covers  
if grasshoppers migrating in are expected or have been a  
problem in previous years, consider applying to uncultivated  
border vegetation a carbaryl bait or try the biological  
control ~~the~~ *Nasuta lewiae*. Mobility restricts  
effectiveness of most insecticides.

(pg. 729) *The New Sunset Western Garden Book*:  
the ultimate gardening guide

David Morgan Professor  
they receive different ~~of~~ crickets  
breed from there  
the one in Big Bear live about a week or so  
they lay their eggs in a cloud  
they get very sticky  
I saw one crawling on my hand + he was  
moving and didn't seem to notice  
the description really helps  
customers told me the feeds for  
cucumbers +  
+ they love them

why does Jordan ~~not~~ prefer ~~understanding~~  
- Shrink (lie up his knees)  
they ~~are~~ a week year + are not  
reproduced at all (if any)  
I've thought about the benefits of  
the earth  
- Sir David Attenborough

entomophagy

little herds  
aspire (cricket farm)  
all over country salt lake, ut, ohio  
SF open bug farm (bug farm)  
open source .diy.

edible baja ~~big muscle~~ sick arizona

little herds  
not for profit

Enviroflight  
soldier ohio

agroprotein - ~~dryer animal~~  
silk africa waste

KULL

short-term to long-term

~~might~~ insects  
U of Wisconsin  
micro-farming units

aspire

cricket

modular fermen  
CC enviro

6 weeks hatch 2 harvest

organic blended diet  
water changed daily

powdered whole

micro-industries

black culture fly larvae

moisture from food they eat  
+ vegetable waste

**NOTES  
w NATHAN  
ALLAN**

Custom blend organic feed

Standardization is an issue that needs to be looked into  
average components

organism  
monitored diet

hopball first farm to be sustainable

not viable

standard product (know what to expect)

flavored tailored diet  
nutritional tailored diet

common 200N

SO NEW

EFFICIENTLY + RESPONSIBLY

is sustainable

"TRAVEL WELL"

microfarming year-round sustainably not just seasonal

food source within weeks

empower communities around the world

OBESITY

DIET

GOVERNMENT SUBSIDIES (other companies have them)

**NOTES  
w NATHAN  
ALLAN**

product makes  
cooking, pasta bars

Pales - Gluten free  
Very healthy - sustainable

FOOTPRINT -

Home

Production since August  
aspire started

densely populated urban areas

MEAT ASIAN + MEXICAN in population

ASIAN - PORTLAND  
DENVER - SF - NY

Reverse osmosis water

Reinwater collection

Reduce carbon footprint

Exothermic

what do they feed on?

how much water a year/month do they need?

do insects drink water or absorb through skin?

where do you get feed to feed insects in farm?

what kind of facilities (farm) are they growing at? Lab? studio/farm?

who currently buys insects for human consumption?

who is your target audience? who would you like to get to eat insects?

do you breed insects for taste/scent/resistance to drought?

what are insect-based products?

how much space do insects require?

what nutrients do insects have?

insects (grasshoppers, crickets, etc) are very high in protein, but what nutrients do they lack?

what fields can you find these nutrients in?

how do you measure the insects for diseases, especially when they're so small?

what's a low-temp rearing? what does the rearing temperature have to be like?

what are the health regulations and regulations you abide by?

ROBERT NATHAN ALLEN

Little herds

CONTACT EDIBLE  
BAJA @ (505) 513-5196  
AZ

5905  
Dixie  
Bldg



can find  
insects

Soy or whey protein

vitamin A + C deficient  
complete protein  
+ amino acids

Custom TAILORED DIET! informed on

Small of fish for used for feeding

fish oil  
fish meal

don't eat anything that eats unhygienic feed

SAFETY + QUALITY

people are eating insects all over the world

**ENTOMOPHAGIST  
ENTOMOLOGIST**

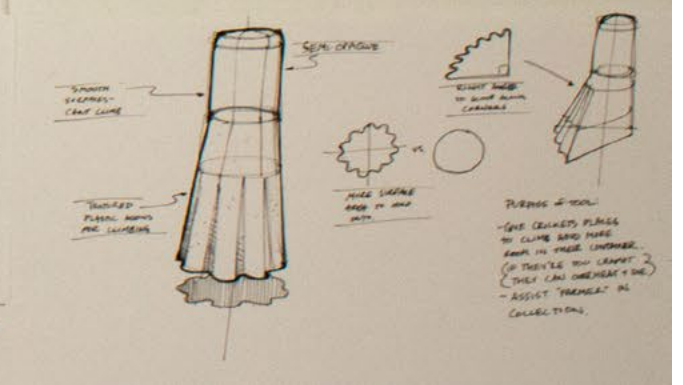
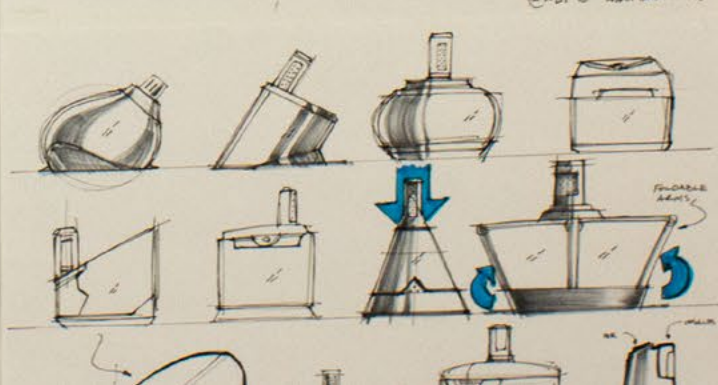
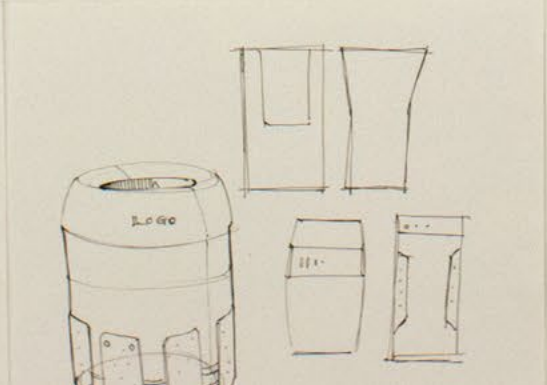
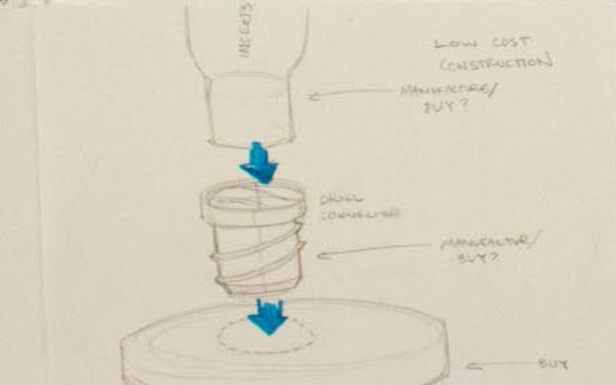
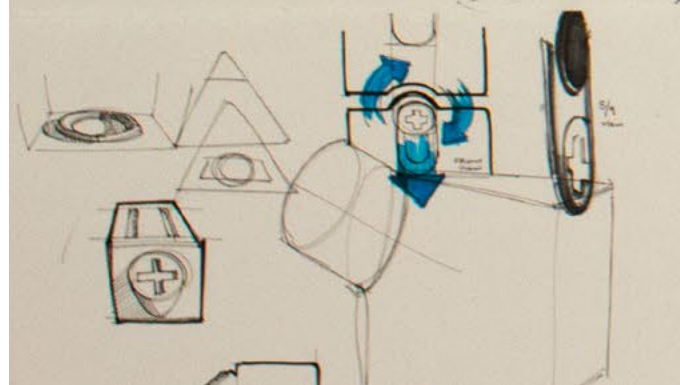
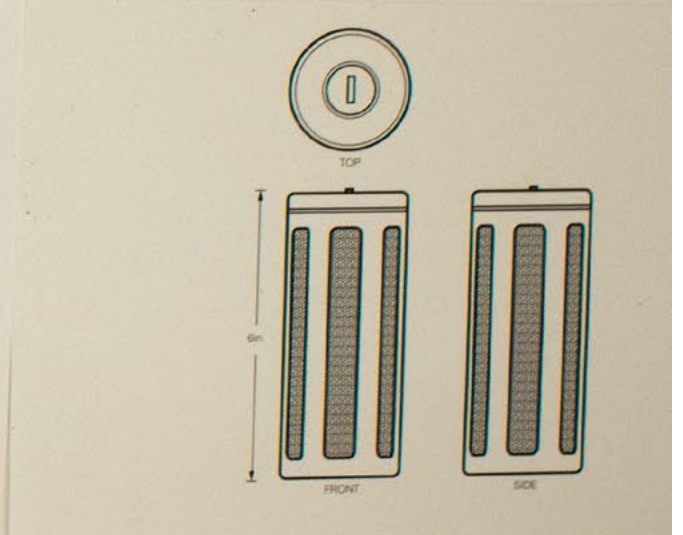
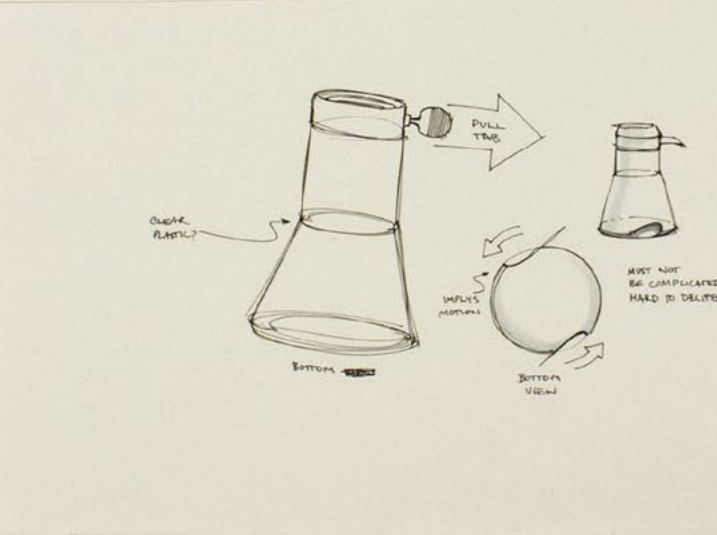
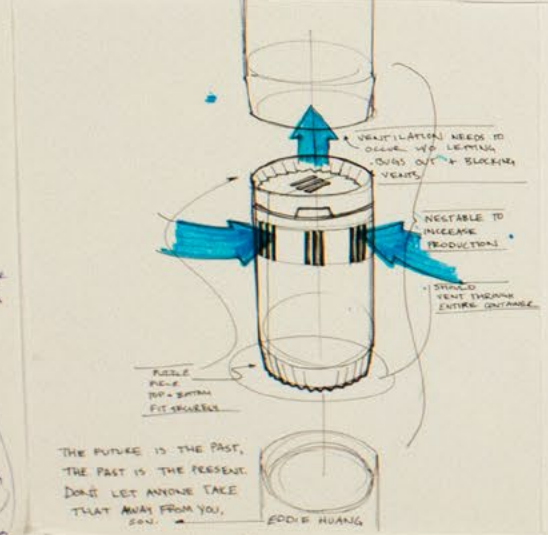
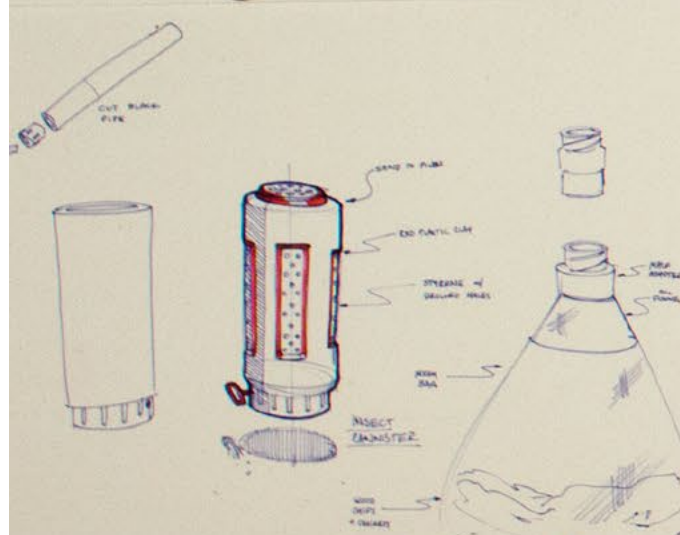
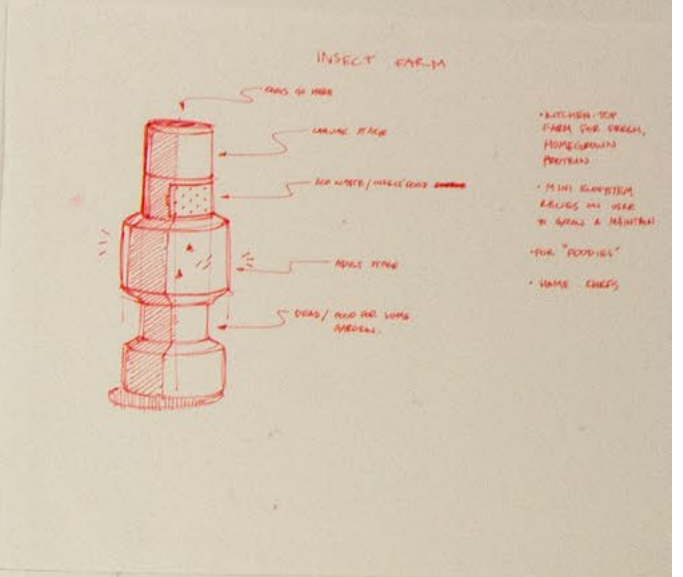
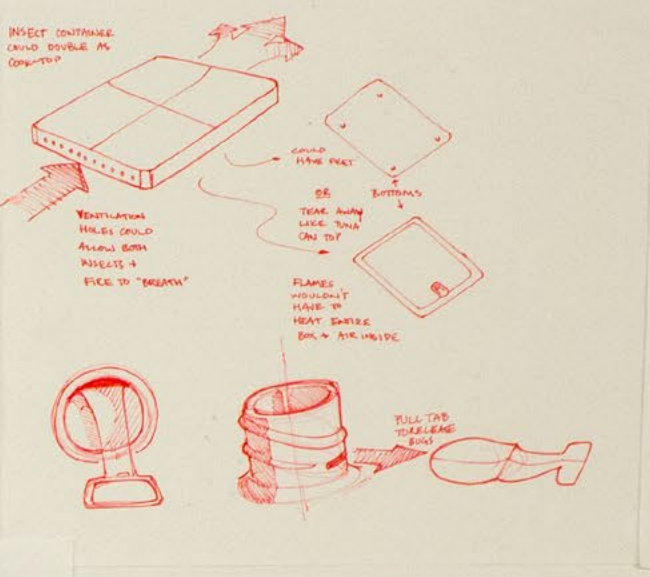
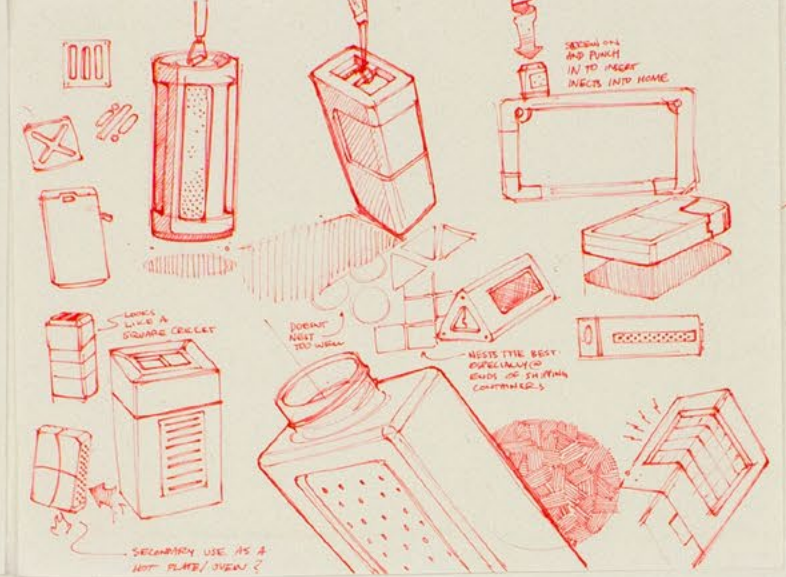
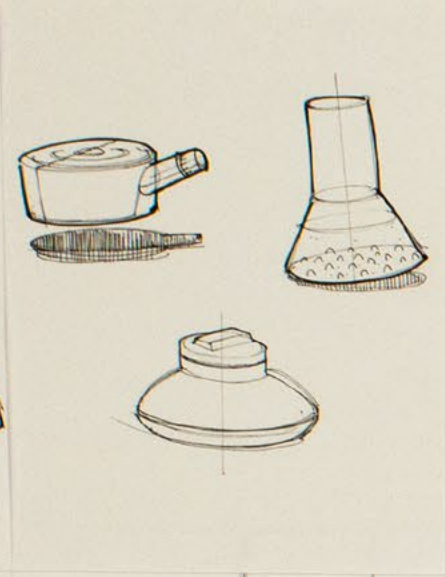
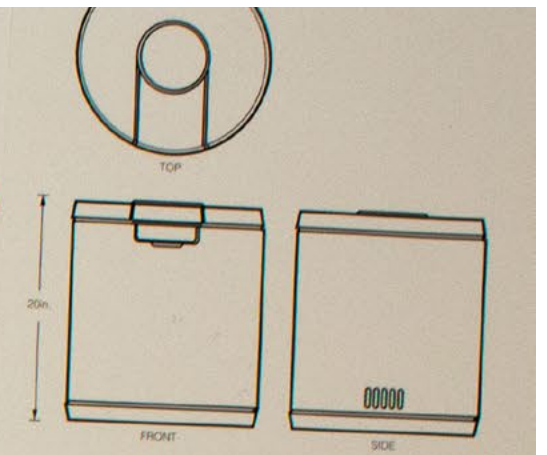
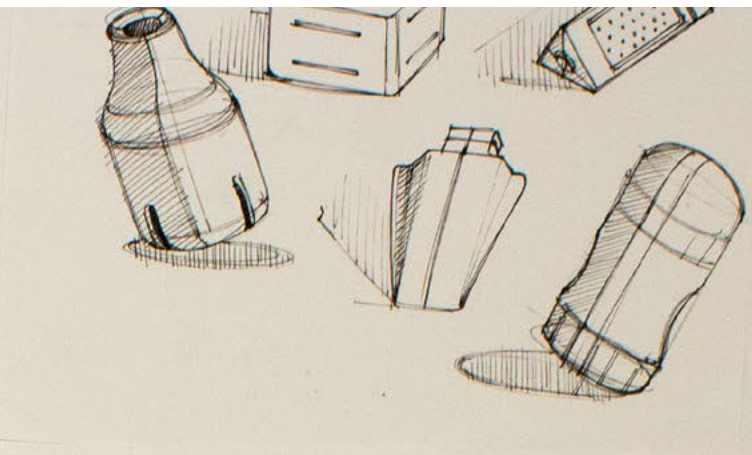
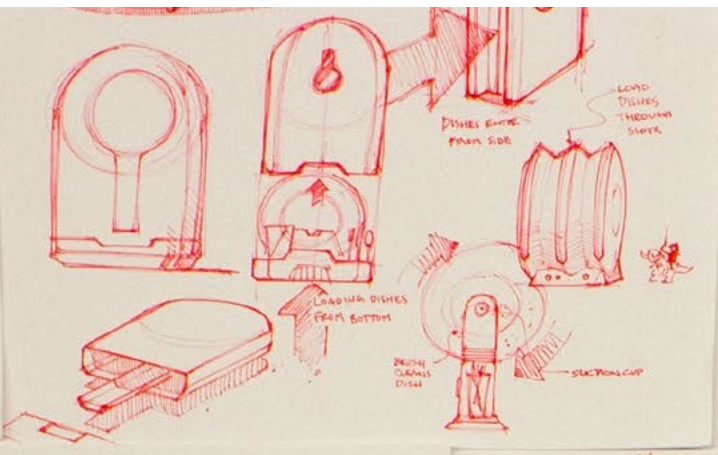
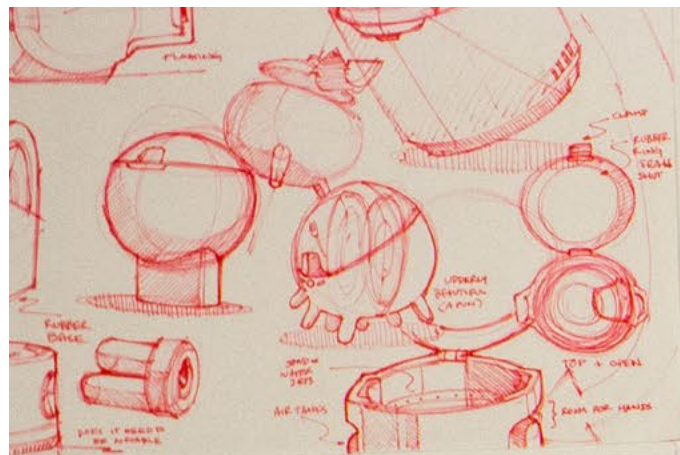
- NUTRITIONIST
- COMEDIAN
- LIVESTOCK FARMER
- CHEF
- FOOD CRITIC
- ~~PET STORE~~
- MOVIE PROP

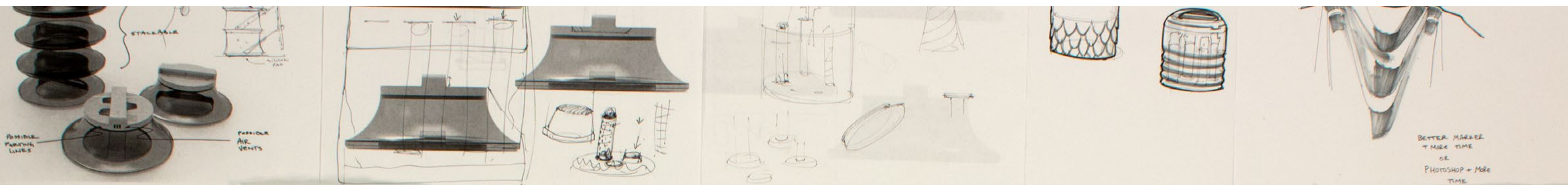
**INSIGHTS**

**INSIGHTS FOUND THROUGH STUDY MODELLING + RESEARCH**

- CRICKETS NEED SMOOTH + ROUGH SURFACES TO DETER + ENCOURAGE 'CL' AREAS, RESPECTIVELY.
- PUTTING FRESH FOOD (I.E CUCUMBERS + LEMON GRASS) PROVIDES THEM W/ WATER TOO, BUT IT ROTTS QUICKLY, ESPECIALLY W/O VENTILATION TO COOL DOWN DARK, HOT, MOIST ENVIRONMENT (PERFECT FOR MOLD)
- YOU NEED TO BE ABLE TO QUICKLY CLEAN OUT FOOD, WATER, FECES, DEAD W/O LETTING CRICKETS ESCAPE.
- ESCAPE IS NO-GOOD, ESPECIALLY WHEN NON-NATIVE SPECIES!
- HARVESTING CRICKETS (or other insects) NEEDS TO BE QUICK, SIMPLE, AND NOT ALLOW ESCAPE.
- CRICKETS NEED ROOM TO BREATHE, ESPECIALLY IN LARGE QUANTITIES.
- THEY CAN CLIMB ON VERTICAL SURFACES WHICH CAN DECREASE HORIZONTAL OR EVEN VOLUME USED.
- THEY SHOULD HAVE A SIMPLE, SELF-SUFFICIENT AIR/HUMIDITY/TEMP. CONTROL. PREFERABLY NO ELECTRONICS.
- THEY NEED TO HAVE A PLACE TO BREED WHEN READY.
- BREEDING GROUND NEEDS TO BE MOIST DIET (WARM I THINK).
- CRICKETS CAN BE COOLED TO A COMA LIKE STATE. OPPORTUNITY FOR EASY COLLECTIONS.

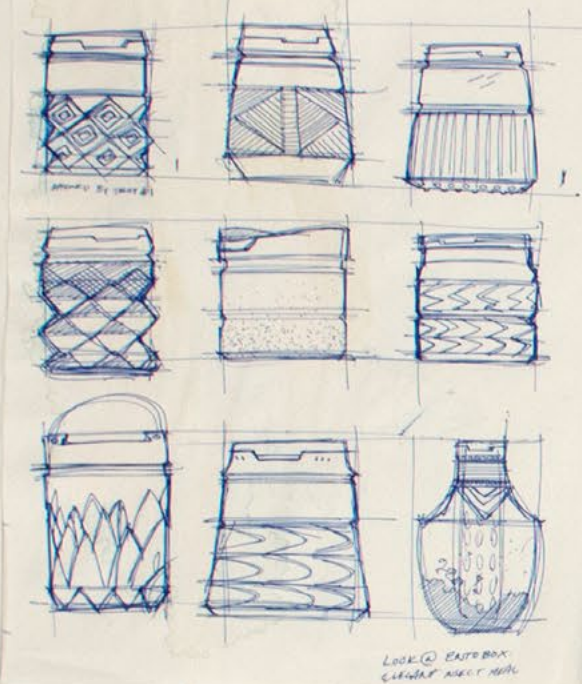




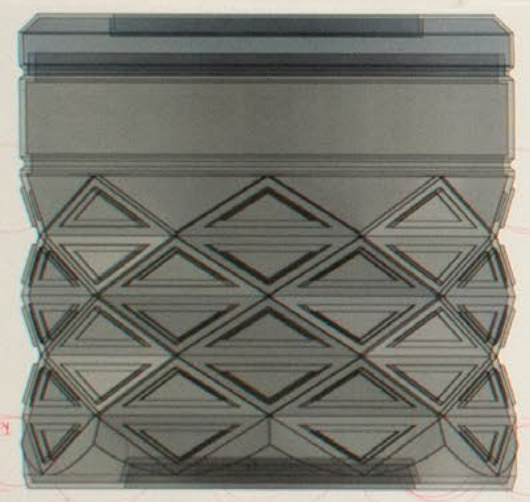
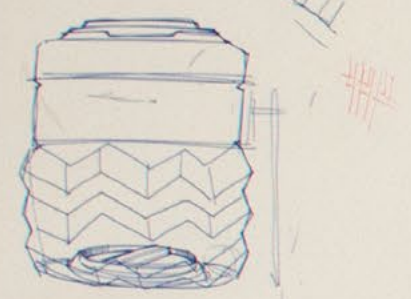


WE DON'T EAT INSECTS?  
 of the lack of this utility such as food quality didn't give function

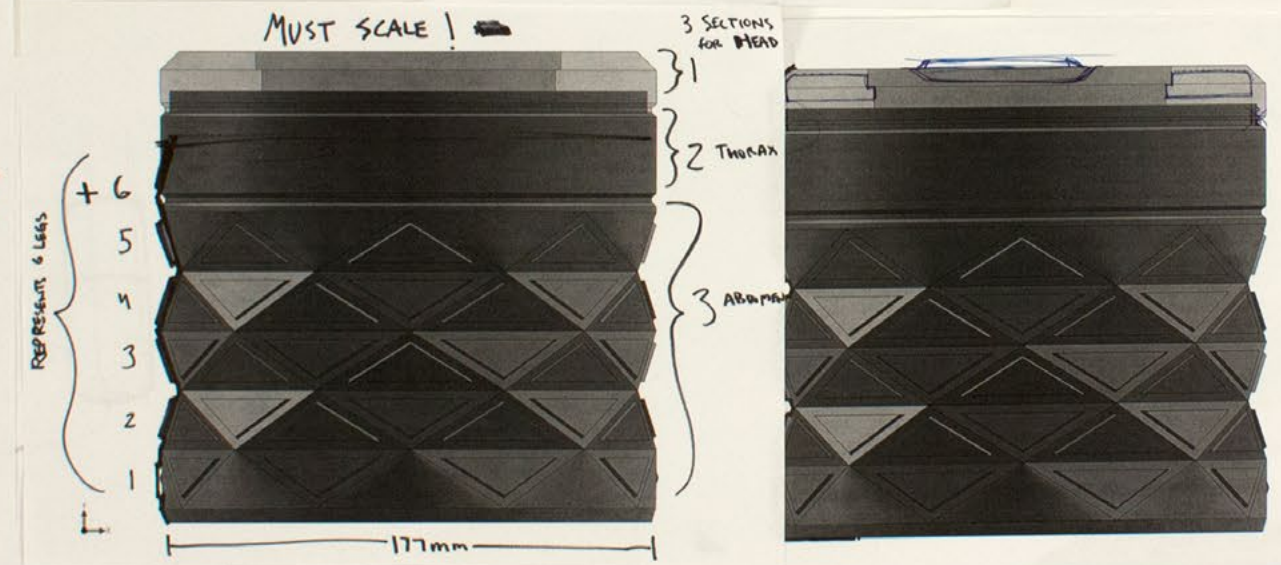
AFRICAN INSPIRED



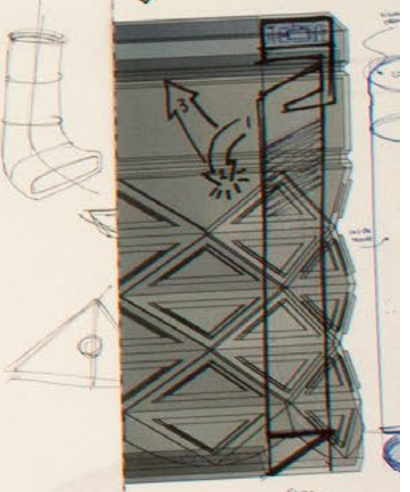
VIETNAMESE INSPIRED



MUST SCALE!



- ① CAP + LID + HANDLE
- ② TRAY
- ③ COLUMN





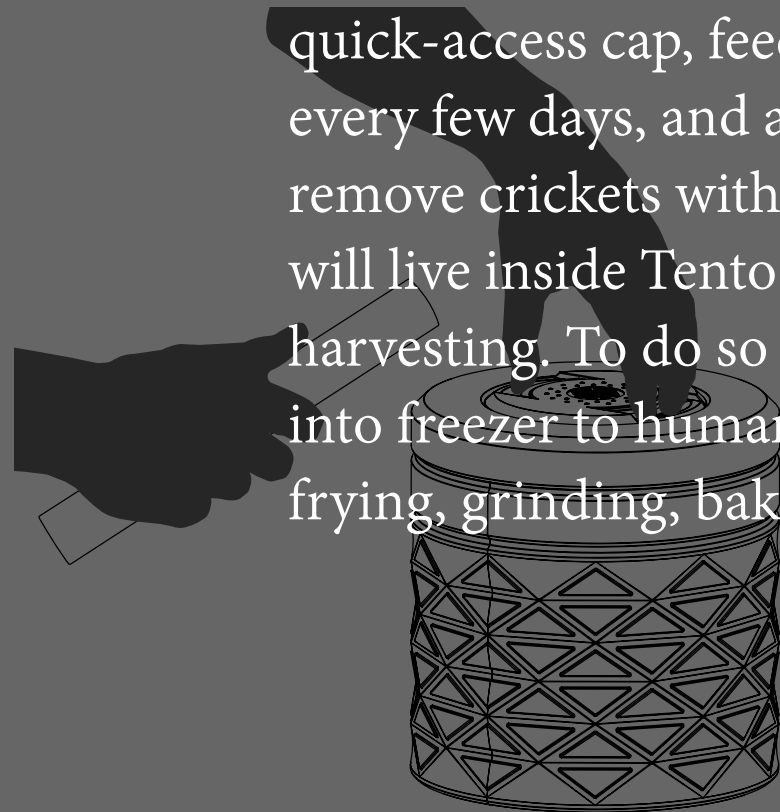
**Final Model**

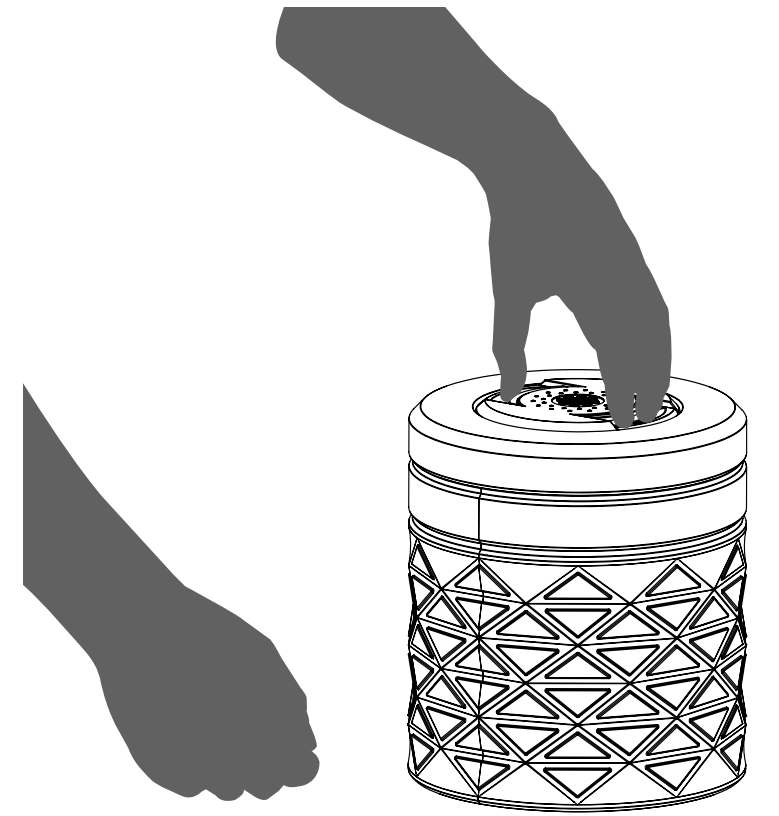
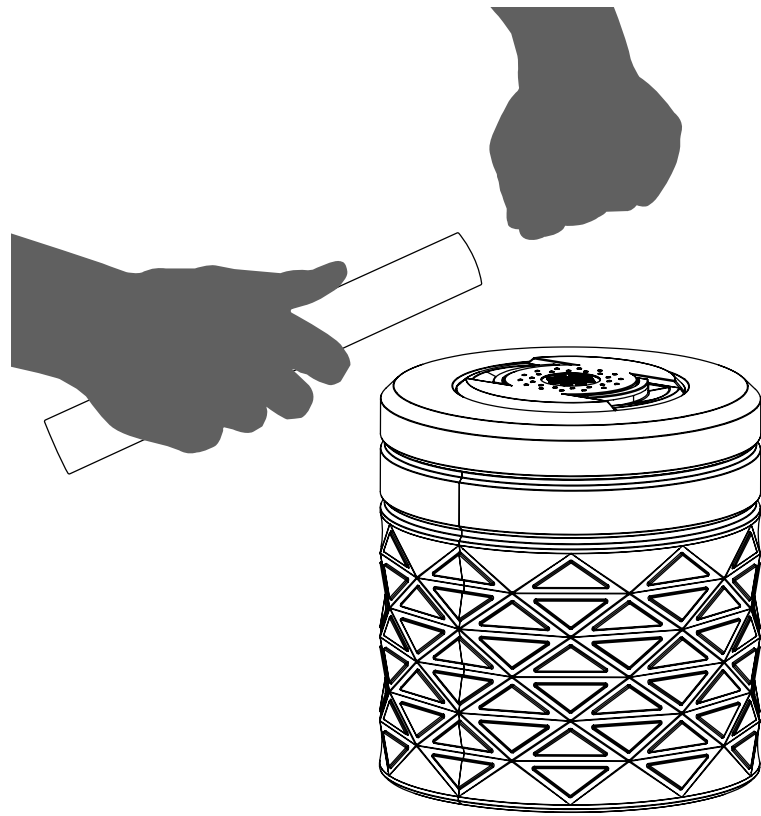




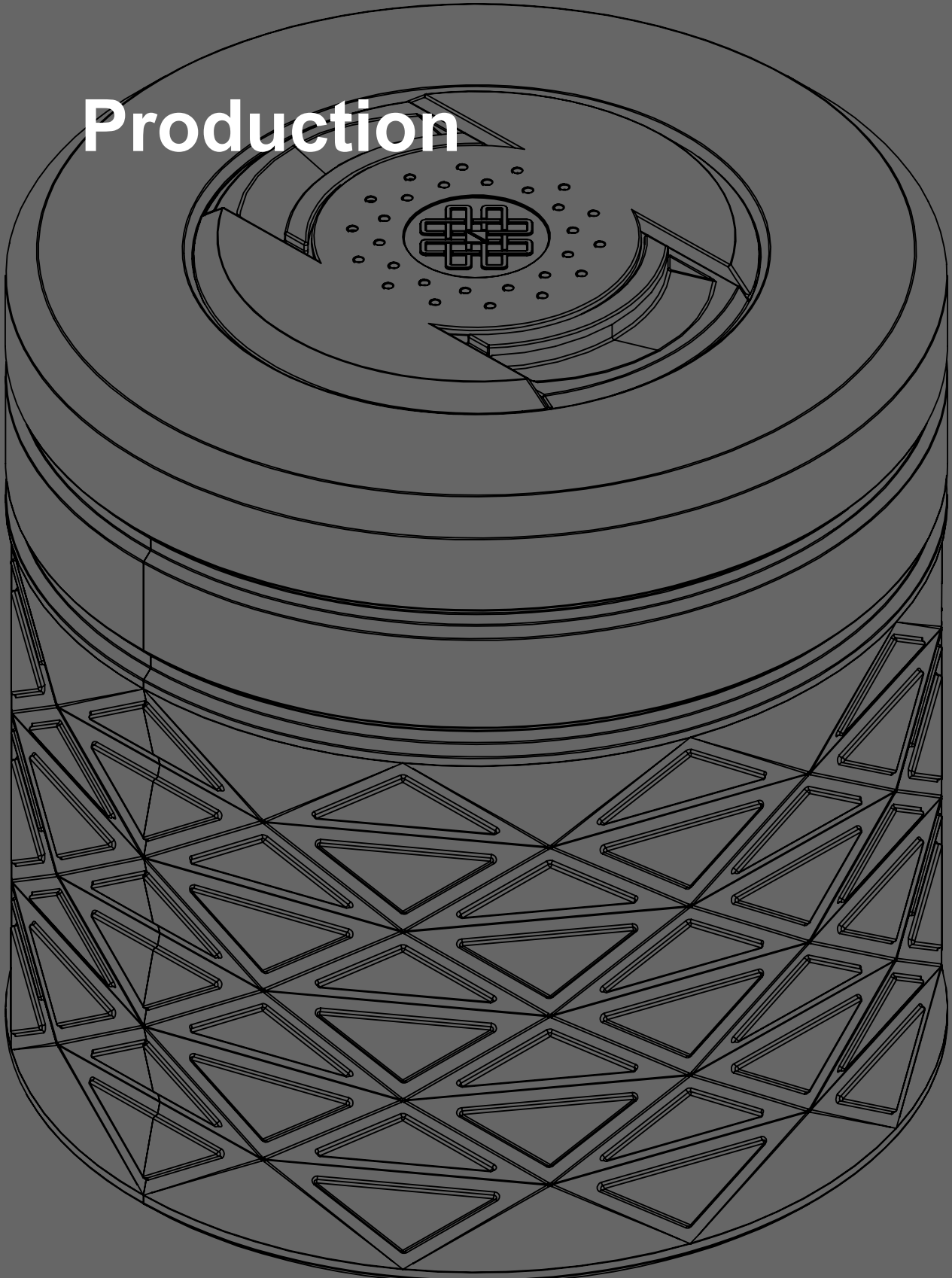
# Process

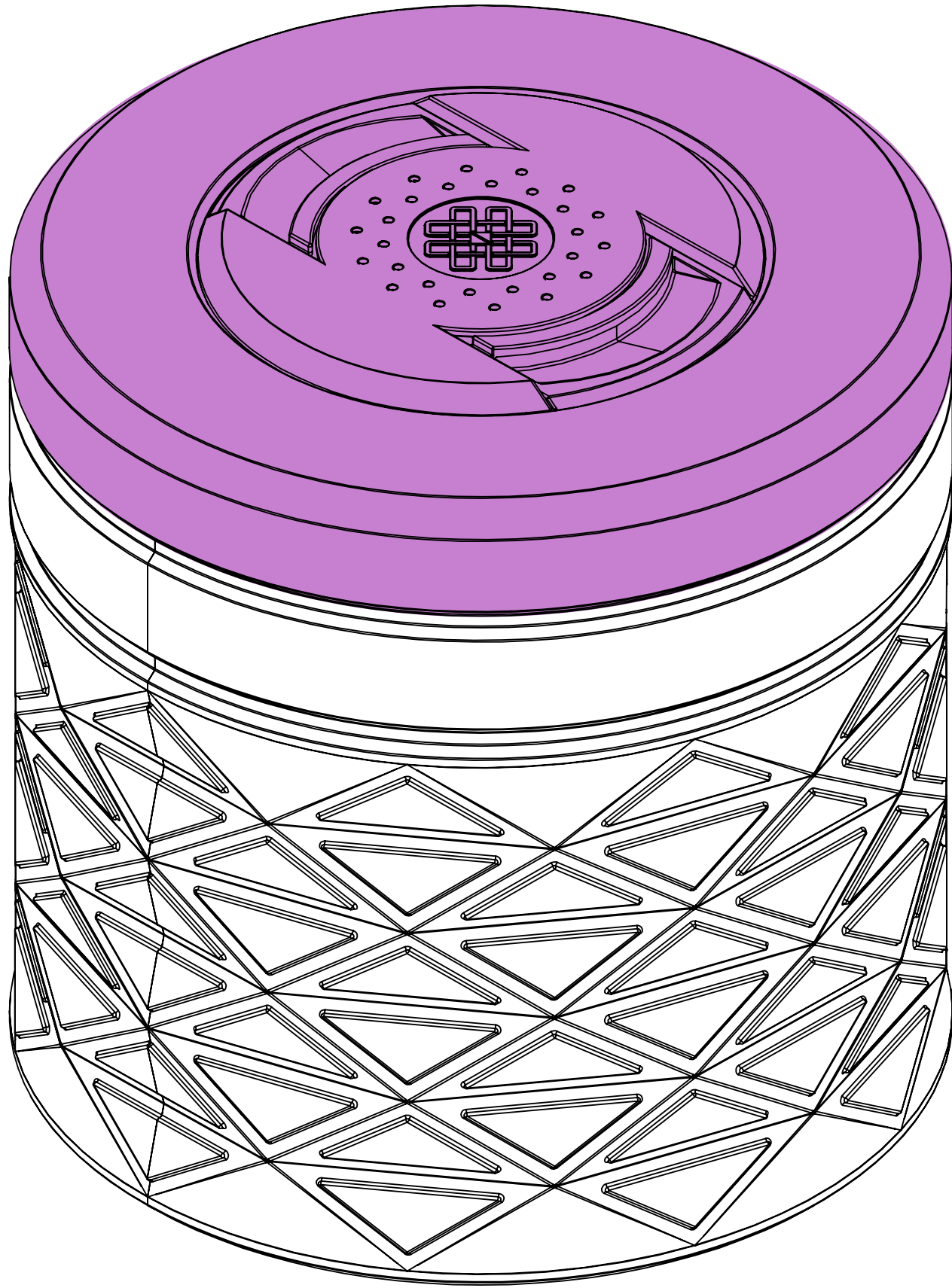
Insert the cricket column through the quick-access cap, feed and water crickets every few days, and at five weeks of age remove crickets with the column. Crickets will live inside Tento until they are ready for harvesting. To do so simply insert column into freezer to humanely prepare them for frying, grinding, baking, etc.



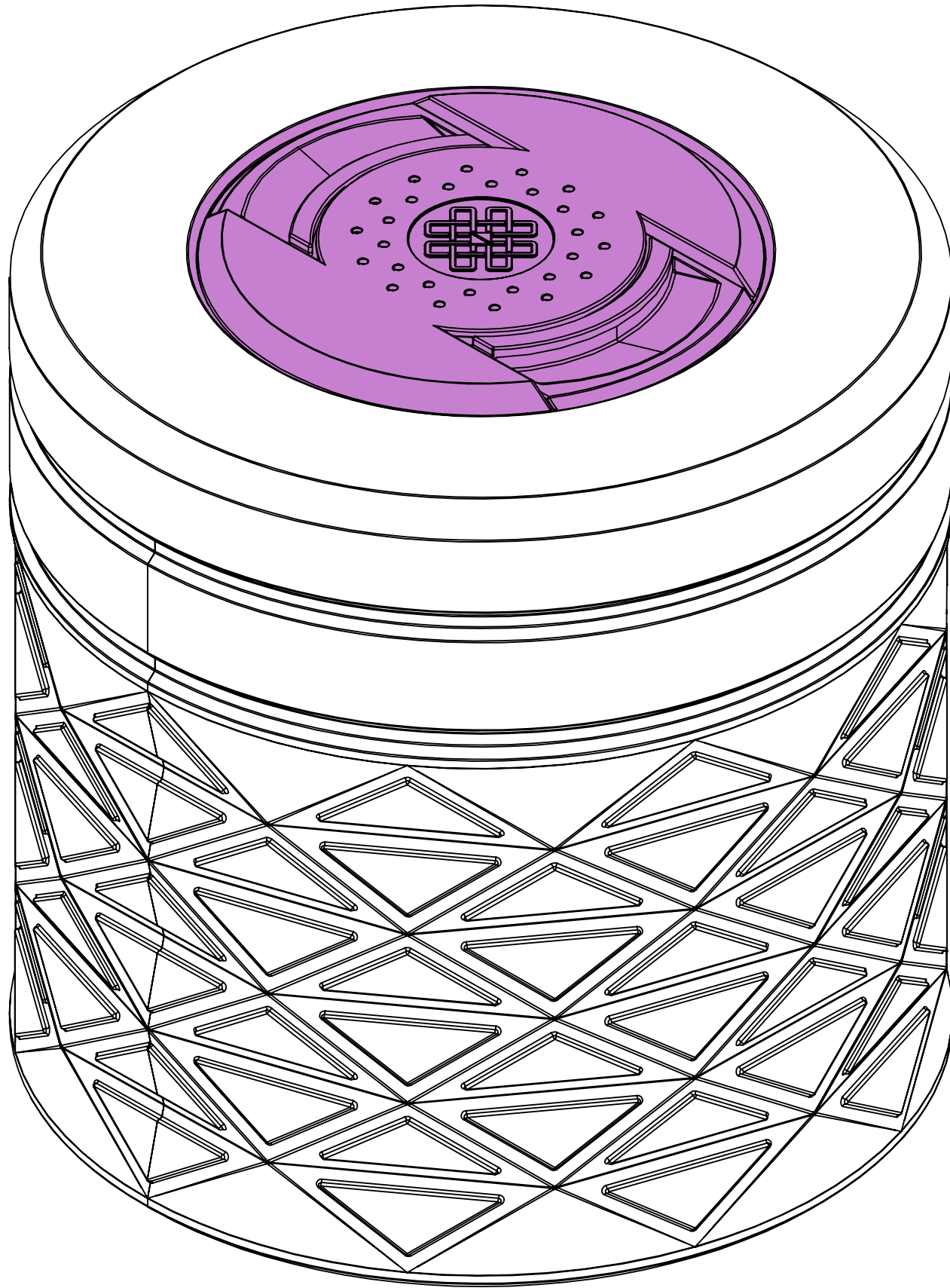


# Production

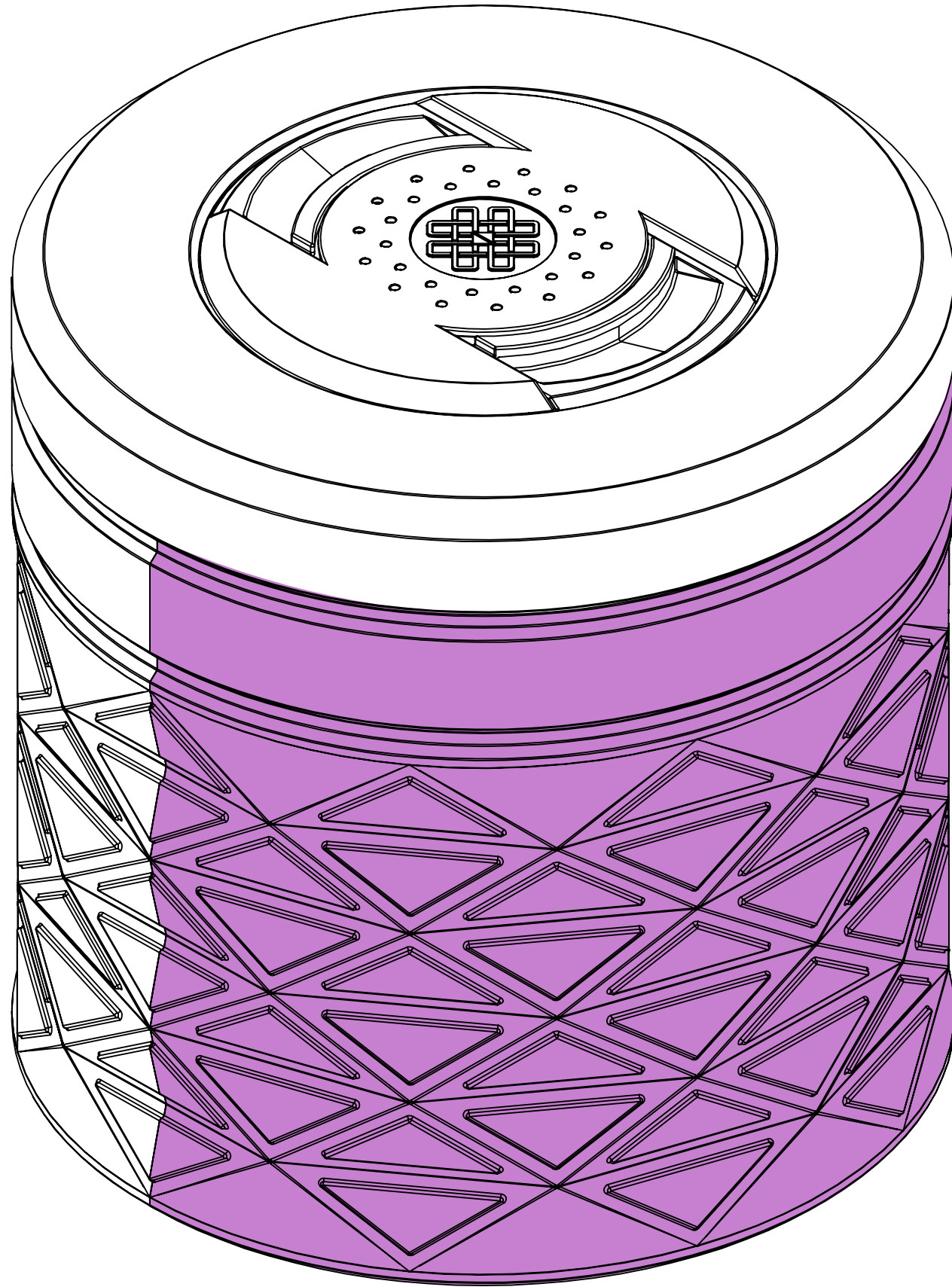




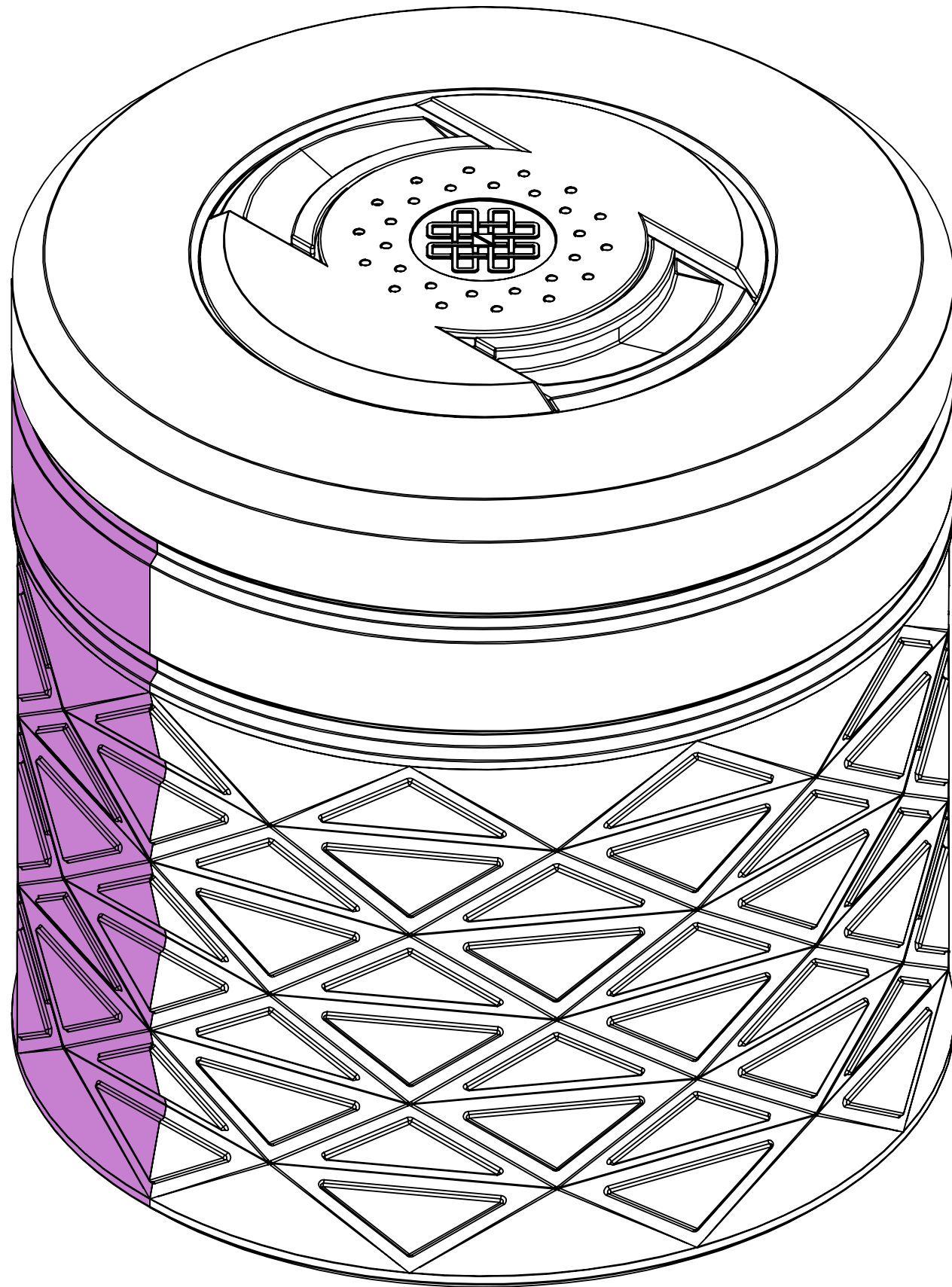
Injection molded PETE lid and cap.



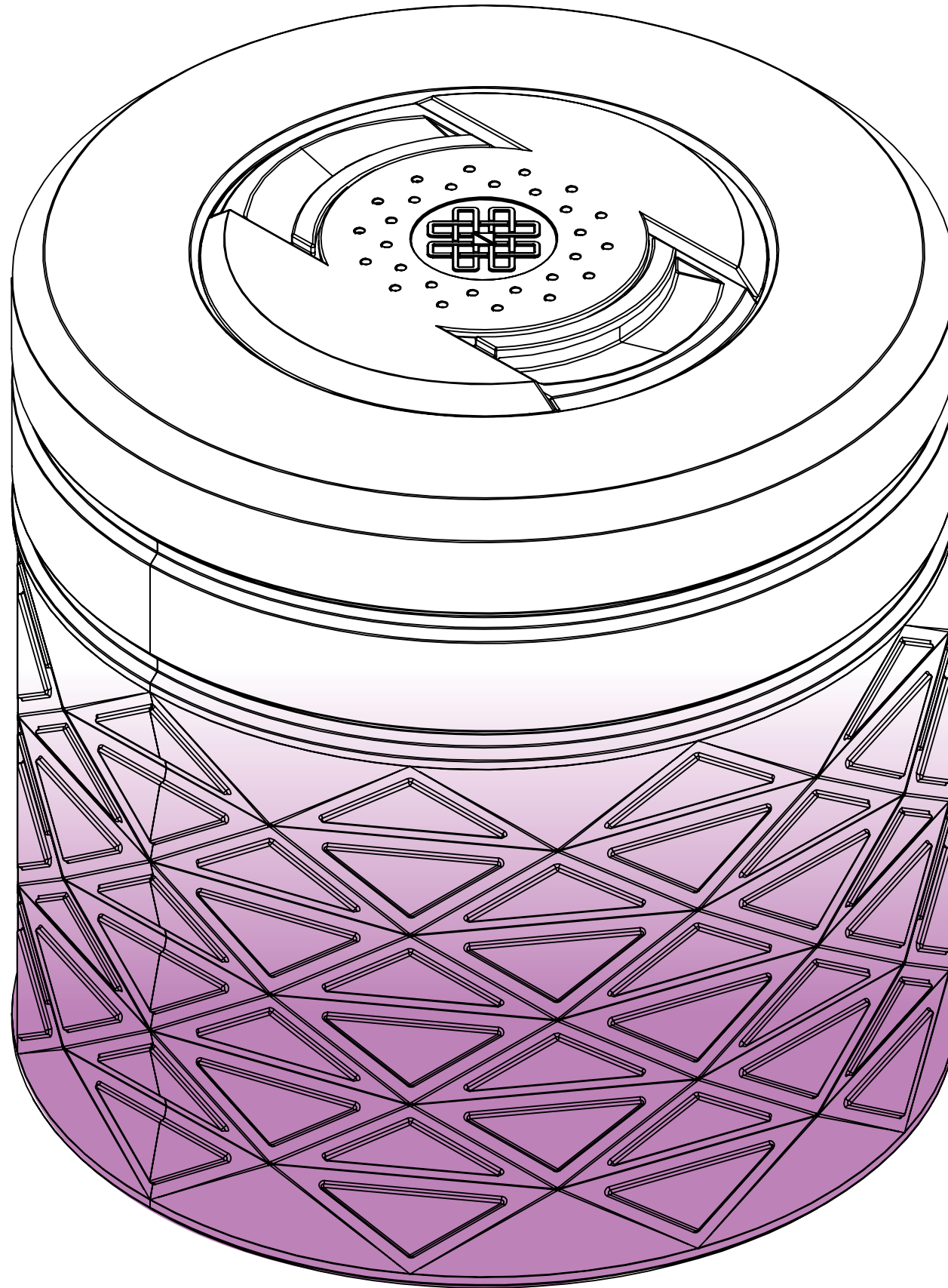
Inside quick release cap exists small, battery powered fan and filter for circulating air.



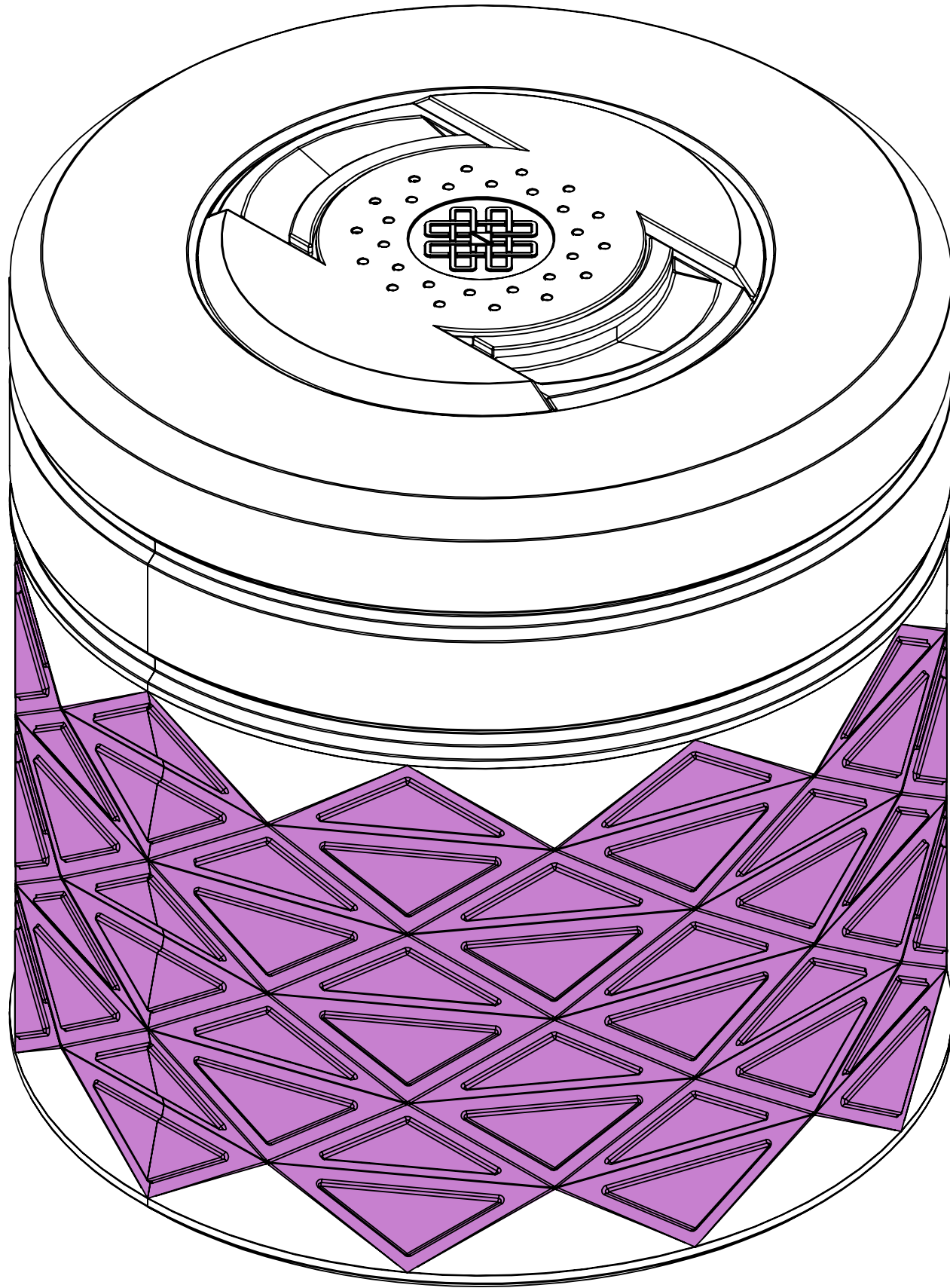
Injection molded PETE body. Edges allude to origin of the word insect (i.e. Insectum: Latin for notched body).



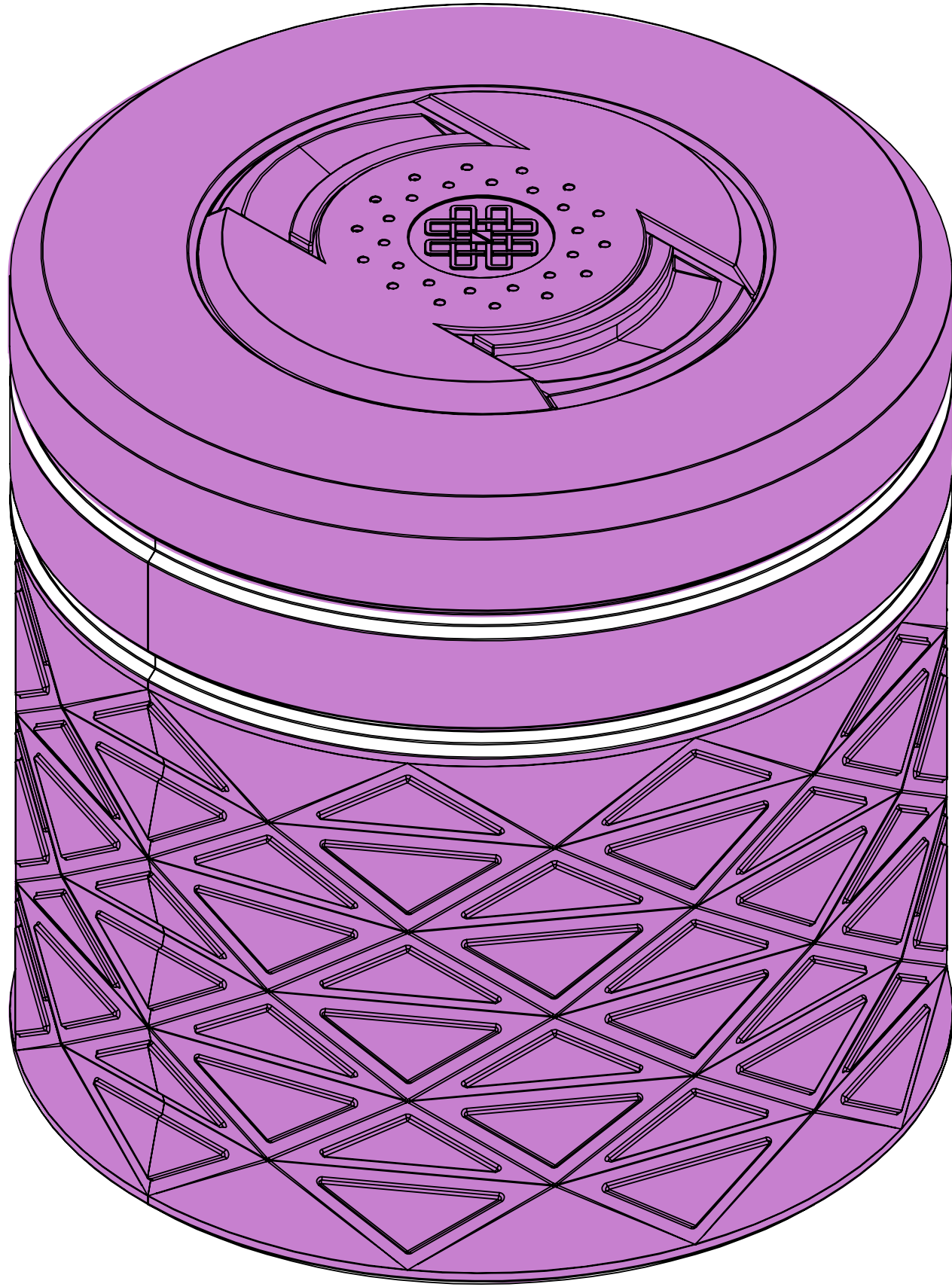
Opposite side can be produced with the same mold, then ultrasonically welded.



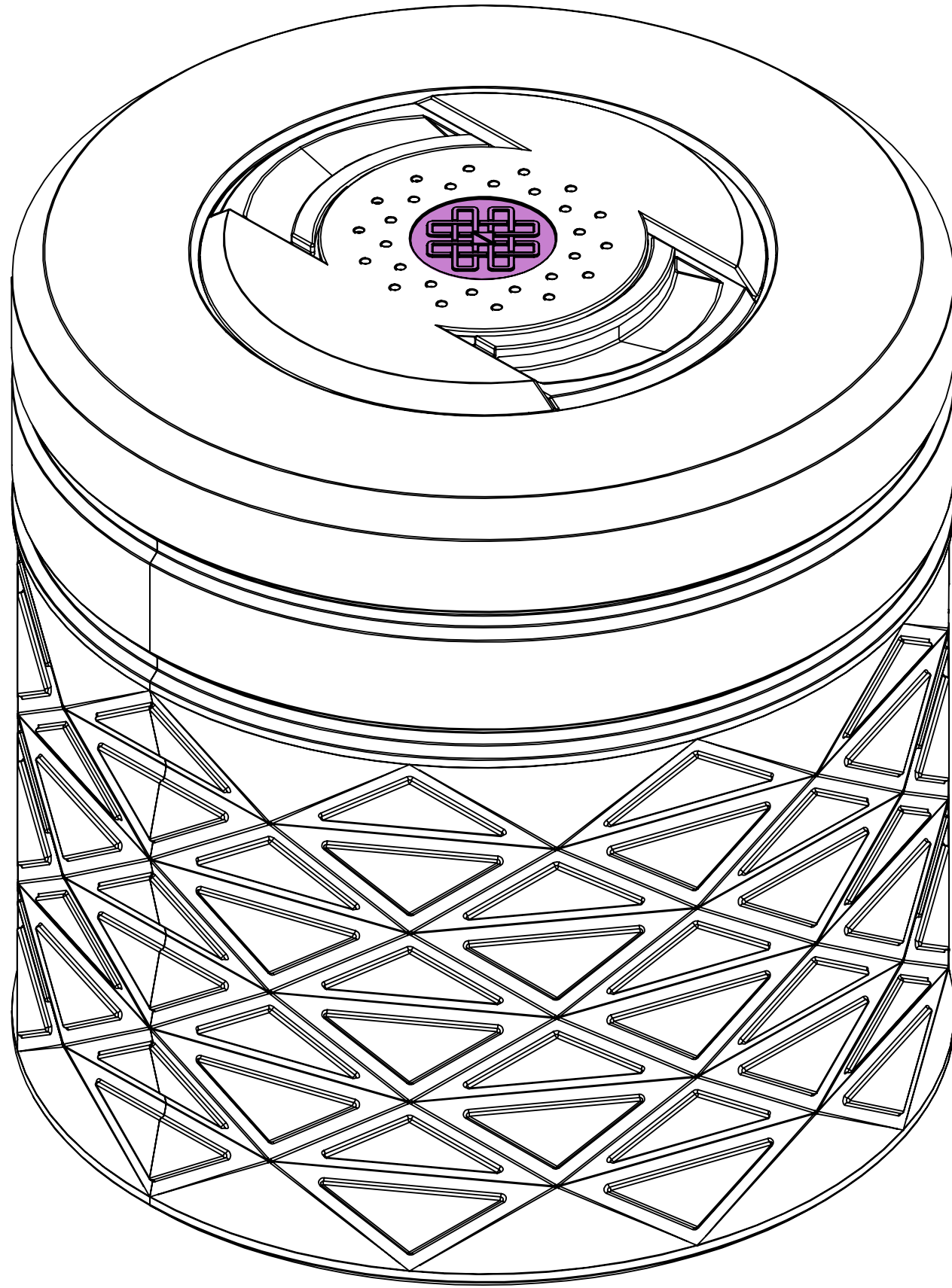
Inside texture of side walls goes rough to mirror smooth to allow crickets more room to crawl around inside, but prevent escape. Clear PETE is used so that visibility is increased at top of body. This allows comfort for crickets (they prefer dark areas) and visibility of interior contents only if the user wants to inspect closer.



Molded faces provide more surface area in allotted space. Pattern is influenced by textile patterns seen in traditional cultures. Six rows alludes to the six legs of an insect.



Dominant, sub-dominant, and subordinate forms allude to the three sections of insect: abdomen, head, and thorax respectively.



Tento logo inspired by a knot, the symbol of interconnectedness- a lesson learned about water use and food through research.

**THANK YOU**



