

OADISH

DISHRACK

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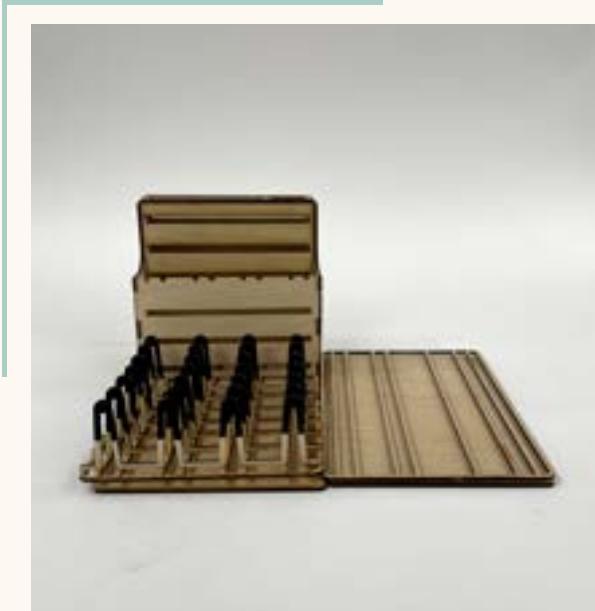
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# OADISH DESIGN

## MAIN FUNCTIONS/DESIGN

A **modular** dish rack that you can customize to fit the needs of your kitchen space! Through our research, we found many issues people had with their current dish racks, such as **poor water drainage**, **excessive counter space** usage, and **limited suitability** for various kitchen items like pots and utensils. Our primary focus during development was on catering to the needs of **solo** individuals, particularly college students **living independently** or in shared spaces like dorms and apartments.

In response to the issues we uncovered, we proudly present a thoughtfully crafted solution: **Oadish** (oh-a-dish). Our dish rack features a customizable and specialized **drying mat** that effortlessly adapts to various small counter sizes and accommodates different kitchen items. The design features a **versatile utensil box** that caters to a wide array of kitchen tools, ensuring practicality and convenience. To enhance your experience further, we've incorporated **noise-reducing silicone padding** for a more enjoyable and peaceful kitchen environment.



Additionally, to address common issues with water drainage our product uses dish mats made out of Diatomaceous earth for rapid drying to **prevent the growth of mold and bacteria**. The mat will also have a silicon coating on the bottom to ensure non-slip functionality for added convenience and a silicone covering on top to protect dishes from possible scratches when in contact with the stone. Users can easily connect the mats as they see fit for their **desired size**.

## PROCESS

Extensive iterations and testing have been conducted to optimize the design of the key features of the dish rack.

1

Our initial focus was fixing the **water drainage system**. We went through many designs such as having a two-story rack where plants could be placed on the bottom section to catch excess water from the plates/bowls to designing a more elevated tray with a spout.



## PROCESS (CONT.)

2

During our user interviews and co-creation session, we found that people are more interested in the idea of **modularity**. The interviewees prefer to have a dish rack that can be easily stored but could also be used during occasions that requires more drying spaces. Therefore, we switched our focus in designing a dish rack that could function in a smaller household specifically towards **people living alone and doesn't have much countertop space**.

3

Additionally, we conducted many tests and research to ensure that the measurements of the plate dividers are **universal**. Starting with initial iterations featuring solid bars, we've changed the design to **accommodate both plates and bowls**.



4

We also experimented with the design of the **utensil holder**. A common issue with many utensil box is that the air holes on the bottom are too wide that most chopsticks in the market won't be able to fit. As a result, we also take chopsticks' measurement into account when we're designing the utensil holder.

## TESTING

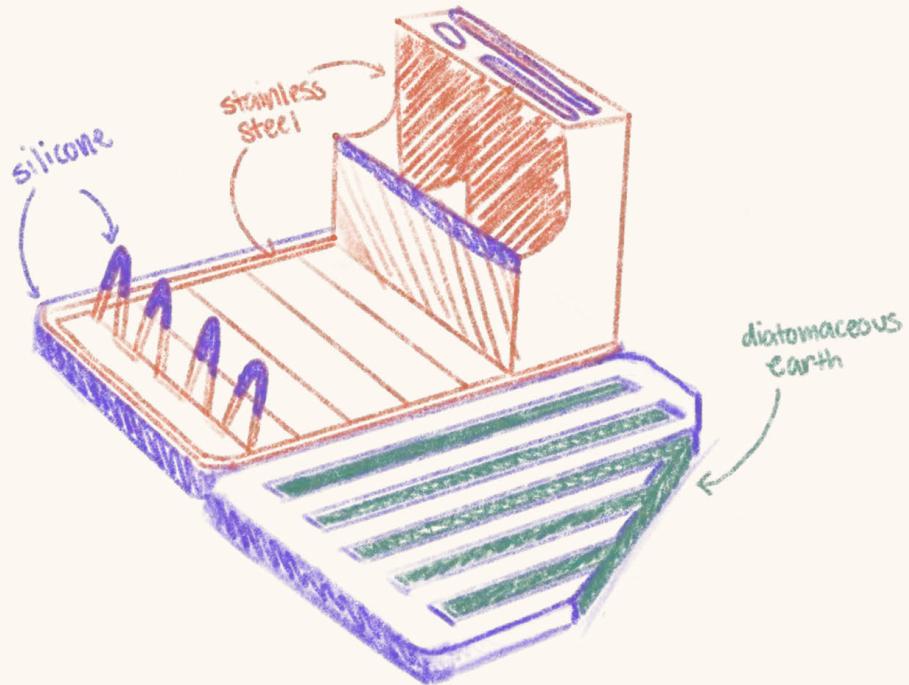
When conducting our **final user testing**, many users have said that the dish rack would be perfect for people who **live alone or don't have a lot of dishes**.

During user testing, it was clear that the users could easily arranged dishes and utensils of various sizes on the expandable mat with prongs. The foldable design provided flexibility in positioning the dish rack, allowing for placement of larger bowls, pots, and cups. However, the hollow design for the utensil holder lying on the prongs was not immediately noticeable to users. Feedback suggested a desire for a base to enhance modularity when utensils are inside.



# MATERIALS

Oadish's material composition was selected based on its durability, cleanliness, ease of use, and overall environmental impact. Material choices played a large part in the creation of the final design, particularly the main three materials used: diatomaceous earth, silver-infused silicone, and recycled stainless steel.



## DIATOMACEOUS EARTH

Diatomaceous earth mats offer a new hygienic approach to bacterial growth resistance in moist environments, most commonly seen in bathrooms and kitchens. These mats are composed almost entirely of naturally sourced diatomaceous earth, which has a high silica content. The unique structure of diatomaceous earth which has millions of micropores enables the material to **absorb and evaporate water quickly**, within approximately four seconds, maintaining a dry environment prevents bacterial growth. Additionally, mats are **easy to care for** and have an extended lifespan (manufacturers recommend replacement after 3-5 years, however sources find that with proper care these mats can last significantly longer).

## SILVER INFUSED SILICONE

Silicone is used throughout the Oadish for its nonslip and waterproof properties. While it is durable, silicone does not inherently possess antimicrobial properties. However when infused with silver and zinc, two elements known for their antimicrobial properties — free silver and zinc ions have the ability to penetrate and disrupt the cell walls of microorganisms and effectively **prevent mold and mildew growth**. Additionally, silicone is 100% recyclable, making it an environmentally responsible choice especially when it can be replaced to extend the lifespan of the product. This silicone compound is both used as a mat to **prevent scratching against the diatomaceous earth and unpleasant noises and possible slipping against the stainless steel rack**.

## RECYCLED STAINLESS STEEL

Stainless steel is often a key material in kitchen appliances because its **anti-rust and anti-corrosive** properties make it ideal for kitchen use. Stainless steel is also **non-leachable**, which makes it food safe, meaning that it does not release any of its components into the food or dishes it comes in contact with. These attributes contribute to the material's longevity and durability in a kitchen environment. Another significant advantage of using stainless steel is its **infinite recyclability**, where it can be recycled repeatedly without any degradation in quality, which is why the stainless steel in Oadish will be derived from **>75% recycled stainless steel** to ensure circularity and reduce environmental impact of mining.

# PACKAGING

Each Oadish product will arrive in packaging that is **fully recyclable**, including a molded pulp packaging made from recycled cardboard and a recycled honeycomb pattern to act as void fill and cushioning to protect the item from breakage during transit.

Inside the packaging, each diatomaceous mat will arrive **pre-assembled** with the silicone cover inside a fitted recycled canvas pouch.

The rack with the utensil box will arrive **packaged in a cardboard box**.

Also included with the product will be card stock with printed care instructions with a **400 grit sandpaper backing**. The card is meant to be saved to easily sand away any surface stains on the diatomaceous earth.



Replacement parts will be packaged similarly on a smaller scale: diatomaceous earth mats will be shipped in molded pulp packaging with honeycomb cushion, silicone coverings will be shipped in recyclable pouches, and racks will be shipped in its box.



# MANUFACTURING

The manufacturing of this product will likely occur in China, since China is the **largest silicon and stainless steel producer** in the world. However, because of the different materials that go into the dishrack, the process will involve **three** different factories, each working on one part of the dishrack, and one quality assessment and assembly center.

## RECYCLED STAINLESS STEEL

The manufacturing process of the stainless steel rack starts with purifying and melting the recycled material, ensuring that any impurities are removed to maintain the quality and integrity of the material. This process is followed by drawing, where the stainless steel is pulled through dies and extruders to stretch the wire to the desired diameter. After achieving the correct diameter, the wire is then subjected to a cleaning process to remove any contaminants that may have adhered during the drawing process and subsequently annealed to enhance its ductility to ensure durability. The next step involves CNC precision wire shaping to achieve the desired shape of each component of Oadish. Because the rack involves multiple separate wires, each individual wire will then need to be welded together to ensure a durable bond.

At the silicone factory, the rack will then be dipped into silicone and then cured to create the silicone tips.

The utensil box, made of brushed stainless steel, is calendered to flatten the metal and then brushed using abrasive materials to polish the surface of the steel, removing a small layer of the metal to create a matte finish.

## SILVER INFUSED SILICONE

The silicone manufacturing process is an intricate process beginning with the extraction of silicon from silica, followed by a series of chemical reactions that purify the silicon. Once the silicon is

extracted, it is polymerized through mixing with various chemicals, including hydrocarbons, to transform raw silicon into the more flexible elastomer known as silicone. After polymerization, various additives are introduced into the silicone compound. In the context of making food-safe antimicrobial silicone products, silver and zinc is infused into the silicone in a way that prevents any leaching into dishes.

The stainless steel dish rack is dipped into the silicone to introduce silicone tips and the dish mat covers are poured into molds to set. After curing, silicone products may undergo additional finishing processes such as trimming, polishing, or painting, depending on the requirements of the final product.

## DIATOMACEOUS EARTH

The creation of Diatomaceous earth mats starts with sourcing naturally occurring diatomaceous earth, mined from sedimentary deposits. Once the diatomaceous earth is extracted, it is ground into a fine powder, which increases the surface area of the DE, which enhances its absorbent capabilities. The DE is then combined with additional minerals including silica to boost its water-absorbing properties. A liquid binder is then introduced to the powdered mixture to create a moldable sludge and poured into molds to shape it into mats of the desired size and design. Once in the mold, the sludge is compressed to compact the mixture to increase its denseness and durability.

# TRANSPORTATION

The impact of transportation on carbon emissions can be significant. To reduce carbon emissions from transporting materials and products from factories to distribution centers to kitchens, the most carbon conscious modes of cargo transport are biofuel, ocean shipping, and electric delivery trucks.

## BIOFUEL OCEAN SHIPPING



According to a Shipping CO2 Impact Calculator by GoodShipping, just shipping 2 shipping containers via cargo ships powered by **bunker fuel or diesel** from Shanghai to New York contributes **3 tons of CO2** to the atmosphere.

But as a far more eco-friendly alternative, Oadish plans to **partner** with GoodShipping, which fuels their cargo ships with **biofuel derived from waste and residue material**. Unlike traditional shipping methods that rely on fossil fuels, biofueled ocean shipping significantly reduces greenhouse gas emissions.

While ocean shipping tends to take longer than cargo planes, the decision to prioritize biofueled shipping demonstrates Oadish's commitment to finding a balance between efficiency and **environmental responsibility**.

## ELECTRIC POWERED DELIVERY TRUCKS



Ground transportation is most typically run by trucks, however **EV Trucking** is becoming far more common with demand for more sustainable alternatives. Electric trucks use battery-powered electric motors, **eliminating the emissions** associated with traditional internal combustion engines. Oadish's goal is to partner with an EV based shipping company to bring products from port to distribution centre and distribution centre to the user.

Ultimately, the collaboration with an EV-based shipping company will provide Oadish with a **competitive edge** in meeting the growing **consumer demand** for environmentally conscious products and services.

## RECS

This sort of carbon conscious transportation plan will take time to implement and scale. In order to make up for any gaps in our transport system, Oadish will offset any possible carbon emissions created by purchasing **clean and renewable energy credits** (RECs) which is a certification that one megawatt-hour (MWh) of electricity is generated and delivered to the electricity grid from a renewable energy resource, in an investment in the future of clean energy and sustainability.

# CONTINUATION OF LIFE PLAN

Typically, the Oadish can be used for **3+ years** without needed maintenance or repair. But because the product can be easily taken apart, parts that are showing signs of wear can be replaced separately. This is why instead of having an End-of-Life plan, we have created an **Continuation-of-Life** plan so the Oadish can last a lifetime.

## HOW IT WORKS

1. Submit an online order for a replacement part. Choose from silicone dish mat coverings, diatomaceous earth mat, dish rack, and utensil holder.
2. The order will ship to you, and Oadish will cover the cost of shipping your used parts back to us so we can recycle or repurpose them properly.
3. When received, you will be refunded 25% of the cost of your order as a thank you for contributing to our mission in creating sustainable products.

## WHAT WE DO WITH USED PRODUCTS

In terms of disposing of the old parts, **stainless steel is 100% recyclable** in a bin with plastics and glass, however the silicone tips on the rack must be removed before recycling. The stainless steel is then remelted with other minerals and metals to create more recycled stainless steel that can be used for anything.

While all silicone can be recycled, not all curbside recycling accepts silicone. Oadish **downcycles the silicone** used in its mats in other silicone products such as toys.

Any received diatomaceous earth mats will be **ground up and turned into a sludge**. Companies such as Soepenberg organize the sale of used diatomaceous sludge and turn it into **products for the agricultural industry and pest control**.

