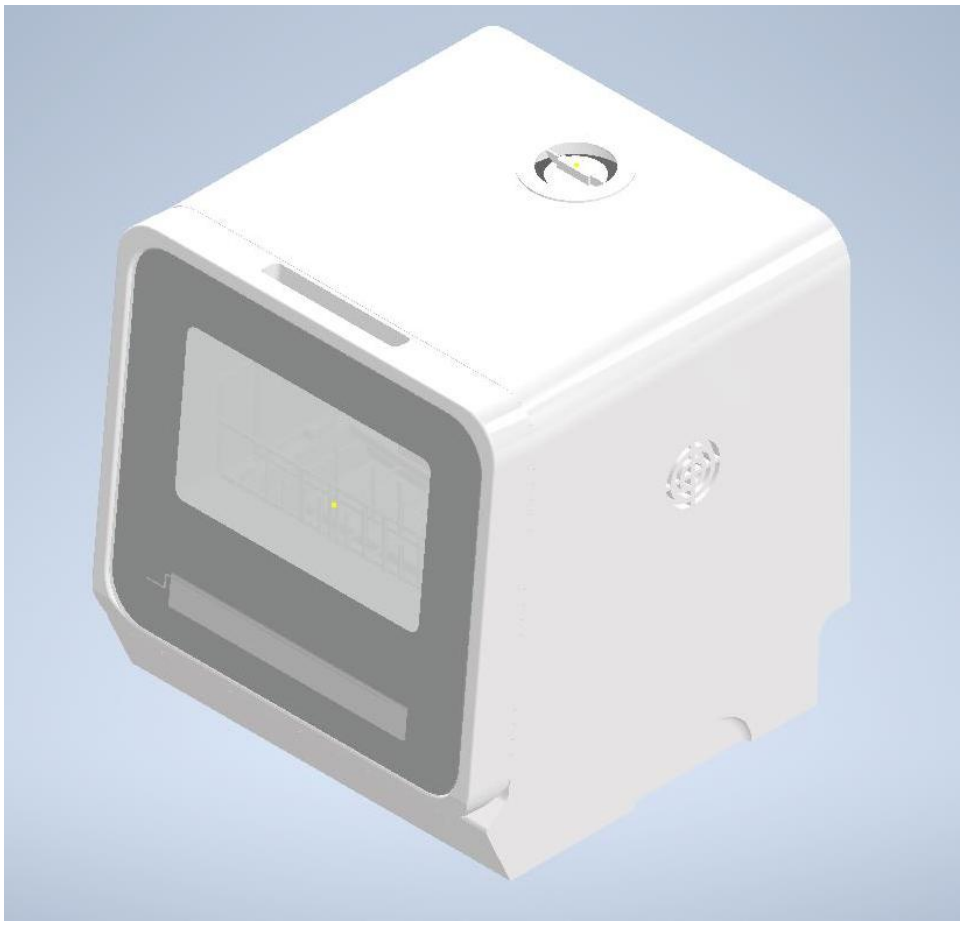
COMPLETE COUNTERTOP DISHWASHER



INTRODUCTION:

I introduce you to the elegant, convenient, and functional design of a fully contained countertop dishwasher made especially for consumers living in smaller footprint dwelling units. Handily, prior to using the dishwasher the homeowner or renter is not required to hire a plumber, carpenter, or any other home maintenance professional as no modifications of any kind are needed to start using. Simply unpack the dishwasher from the box, position near a sink or place small bucket nearby, plug in, and start washing. One can now begin to professionally wash his or her dishes automatically and achieve great results. The dishware will always come out of the unit “squeaky” clean as it also sterilizes the contents by heating up both wash and rinse water up to 158 degrees Fahrenheit. As mentioned, there is no need to plumb-in the water intake for this unit as it has its own self-contained water tank that is filled prior to commencing the dishwashing cycle. However, if one chooses not to fill the water tank, they can simply use the adapter and plug in directly to a kitchen faucet or any other water source. For a more permanent install, one does have the option to plumb-in both intake and drain, giving the end user the most possibilities to suit their personal preferences and needs.

END USER:

The dishwashing unit is geared for apartment dwellers, tiny homes, RV's, boats, or anything in between. Basically, anyone that would like to have a 2-setting dishwasher without going through the hassle, commitment, and install costs of a permanent dishwasher. Its modern, simple, and elegant design blends in nicely with most kitchen configurations and makes good

use of limited counterspace. One will no longer be required to wash all the components of his or her dining set inside the kitchen sink with what often is an overly used, dirty sponge and luke-warm water.

CONSUMER BENEFITS:

Besides the health and convenience factors that come from owning this machine, circumstances that can benefit most consumers, another major benefit of owning this unit is geared to those who rent (do not own) their primary residence. When the lease is up or it's time to move, simply take the dishwasher with you and on to the next place. Also, that fact that when one is renting an apartment that does not come with a built-in dishwasher, he or she may be unable to effectively clean the dishes by hand due to less-than-ideal environmental conditions. How hot of water can one wash dishes by hand? Certainly not 158F… Having a self-contained dishwasher that will effectively sterilize the dishware and silverware benefits the end users' overall wellbeing. While it's true that large pots and pans will not fit inside the unit and will need to be done by hand, this is also generally true for larger built-in units as well; it is commonly done this way in non-commercial kitchens. The bulk of the dishware used by one to two people can be processed through this machine, not only saving time but also money as the appliance is more efficient and uses much less water than compared to typical washing in the kitchen sink.

FUNCTIONALITY:

This is a proven design which has been based on traditional dishwashers; just shrunk down with the addition of a self-contained water tank. The machine is very practical and reliable, the design is proven in the field. The normal (recommended) wash cycle is programmed to last 2 hours 7 minutes with one wash and two rinse cycles, this includes 45 minutes of air circulation (dry time). There is also a quick wash option that skips the second rinse and the dry time, taking only 47 minutes to complete. The machine works best when not overloaded and it is suggested that the user to periodically check the pump filter for large food debris to guarantee optimal performance.

HOW:

The water is heated by using an electric heating element (supplier manufactured) that is placed toward the bottom of the self-enclosed aluminum water tank. Because of the small size if the tank, the water is brought to operating temperature within minutes. The heated water is then circulated primarily from one major spray arm plumbed-in on a swivel placed inside on the bottom of the main housing. The spray arm naturally wants to spin, its movement is powered by the machine maintaining water pressure and the laws of hydrodynamics. Once the specified amount of water is pumped into the primary basin the water is continually recycled for the duration of its designated cycle, being filtered every time it is recaptured. This safeguards the integrity of the pump as the system is not comprised by large debris or the build-up of food particles. Keeping the pump clean and able to move the necessary volume of water per minute specified (pump: supplier manufactured) keeps the spraying, therefore cleaning, to be

accomplished at exceptional levels. Properly maintained, all components will last throughout the lifetime of the machine.

In addition to the main spray arm located at the bottom on the interior housing, there is a secondary top spinner that sprays water in the opposite direction located on the top of the interior housing. Although less water is moved through this secondary spinner it is powered by the same hydrodynamic properties as the main spray arm. At the end of the wash and rinse cycles, when selected, there is a 3-inch electric fan (supplier manufactured) that engages to circulate the now heated air around the interior of the machine, effectively drying the dishware. When the cycles are complete the dishes which will come out brilliantly clean and hot to the touch.

COMPETITION:

While there is some competition in the marketplace for a niche product like this one, none can perform as effectively, be purchased at the price point chosen (because of intelligent manufacturing/materials), or look as good in the home. The design of the unit has elegance in mind with the use of modern lines and ergonomic curves. The unit is visually much less “boxy” than the competition and can blend in easily with most decor. Not only does the machine have a smaller footprint than the primary competition, but it’s also the fact this is achieved without sacrificing the overall internal capacity of allotted dishware.

ASSEMBLY:

The primary assembly of the self-contained dishwasher can be completed in a chosen facility of manufacturing and is comprised of the 15 components listed in the appendix. The primary housing unit is likely is the most complicated and time-consuming component to create, however, once created all other 14 units fit neatly into place to create a fully assembled, finished product. After the comprehensive assembly of the countertop dishwasher is finalized, the unit is then tested to guarantee total customer satisfaction. Following the positive completion of the testing process, the dishwasher is packaged and shipped directly to the consumer after ordering directly via the company e-commerce website. In addition, the unit can also be found on Amazon.com.

SUB-ASSEMBLY/ASSEMBLY:

The final assembly consists of two major sub-assemblies; sub-assembly 1a and sub-assembly 1b. Sub-assembly 1a contains 10 parts, sub-assembly 1b contains 5 parts. The two mentioned assemblies are then combined to make the one finished product. The first major assembly, sub-assembly 1a, consists of the main housing unit and all internal components thereof. The second, sub-assembly 1b, is comprised of the door and the components required to make it functional.

MATERIALS:

The primary material used in the build are various types of heat resistant food grade plastic. This material is used for many, if not most of the components, including the main housing unit and door. There is also tempered glass found inside the door so that the consumer can view the dishwashing cycle. In addition, an aluminum tank can be found inside the main housing. Typical gasket type parts are made of a rubber-based material. The dish basket is made of steel alloy but has a “dipped” plastic finish to prevent corrosion.

COST TO PRODUCE:

Because the design team “Kitchen Lifestyles for the Apartment Dweller” has decided to use various types of plastics as the primary material of the build, the cost of production has been kept to a minimum so that this sophisticated appliance can be produced for approximately $215 USD including labor. Some components that are not listed on the manufacturing docket were found to be most economical by outsourcing from other suppliers. This includes the main pump, heating element, fan, and filter element.

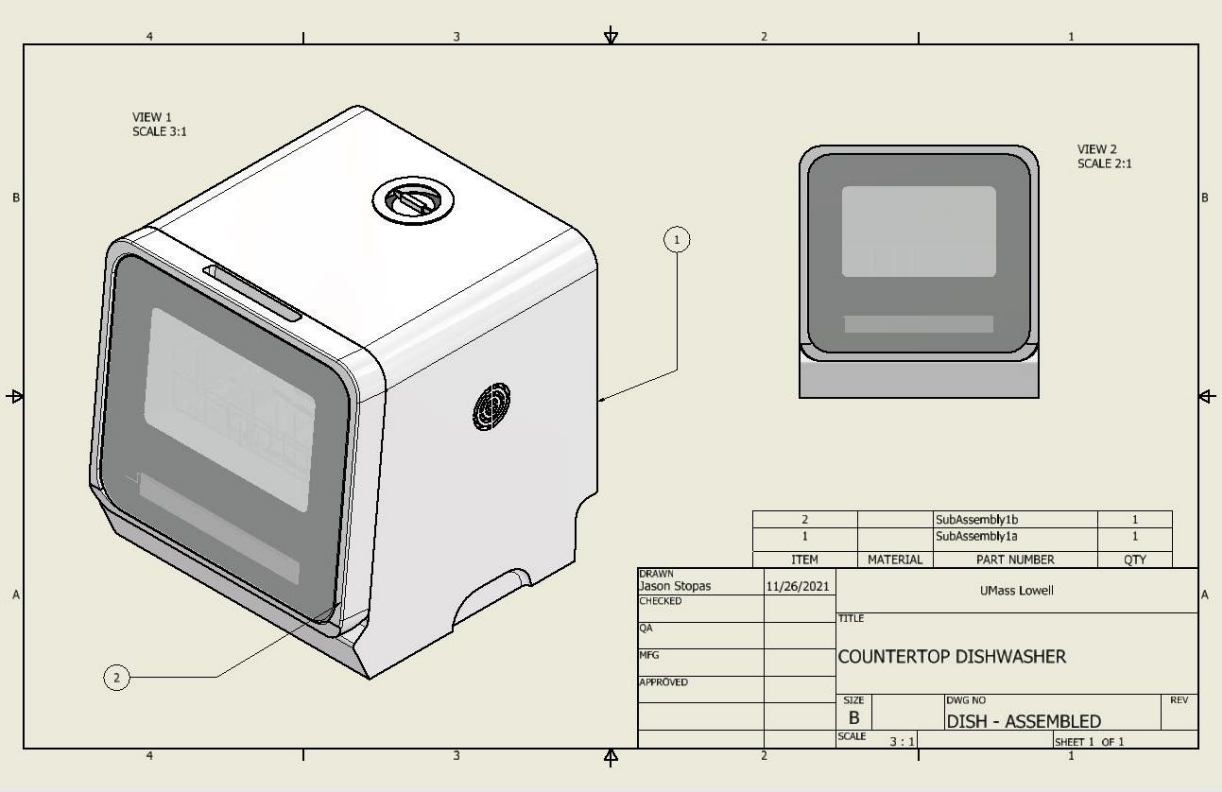
WHY:

The design is innovative as it appeals to a niche consumer group looking for this type of machine, an area where there are limited options available. The demographic: those who want a dishwasher but either A) they don't own their residence and cannot justify a permanent type install/investment or B) live in a recreational vehicle or a marine vessel where the space is

extremely limited and would prefer to use a dishwasher. As a bonus, this unit could be built in and plumbed to make more permanent look but as you know from reading this report this is not required. The reality that the dishwasher sanitizes while cleaning is beyond the scope of what somebody could do by hand and is what ultimately justifies the purchase to the consumer.

APPENDEX

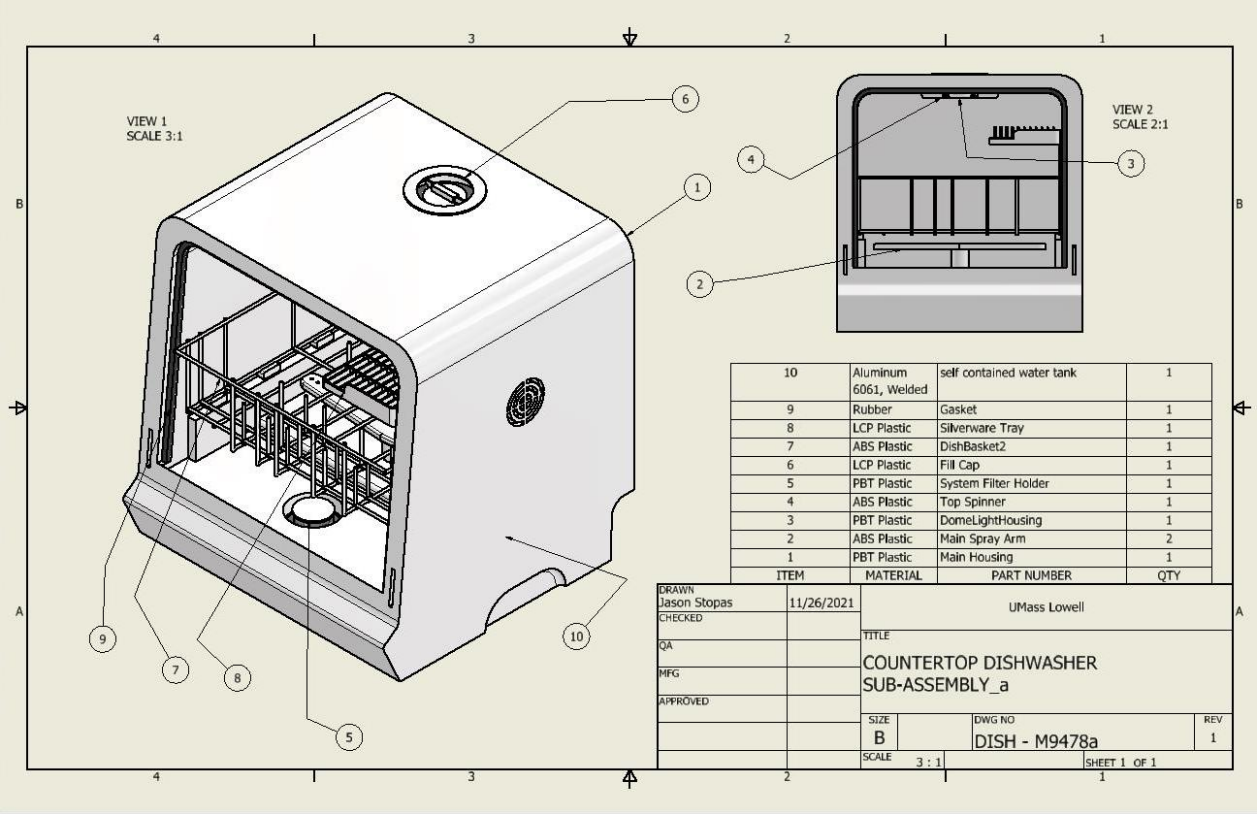
- <u>DISHWASHER ASSEMBLED [SUB-ASSEMLBLIES 1a & 1b]</u>



- <u>BILL OF MATERIALS DISHWASHER FINAL ASSEMBLY (1a + 1b)</u>

	A	B	C	D	E	F
1	Item	Part Number	Thumbnail	BOM Struc	Unit QTY	QTY
2	1	SubAssembly1a		Normal	Each	1
3	2	SubAssembly1b		Normal	Each	1

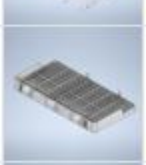
- <u>SUB-ASSEMBLY 1a</u>



ITEM	MATERIAL	PART NUMBER	QTY
10	Aluminum 6061, Welded	self contained water tank	1
9	Rubber	Gasket	1
8	LCP Plastic	Silverware Tray	1
7	ABS Plastic	DishBasket2	1
6	LCP Plastic	Fill Cap	1
5	PBT Plastic	System Filter Holder	1
4	ABS Plastic	Top Spinner	1
3	PBT Plastic	DomeLightHousing	1
2	ABS Plastic	Main Spray Arm	2
1	PBT Plastic	Main Housing	1

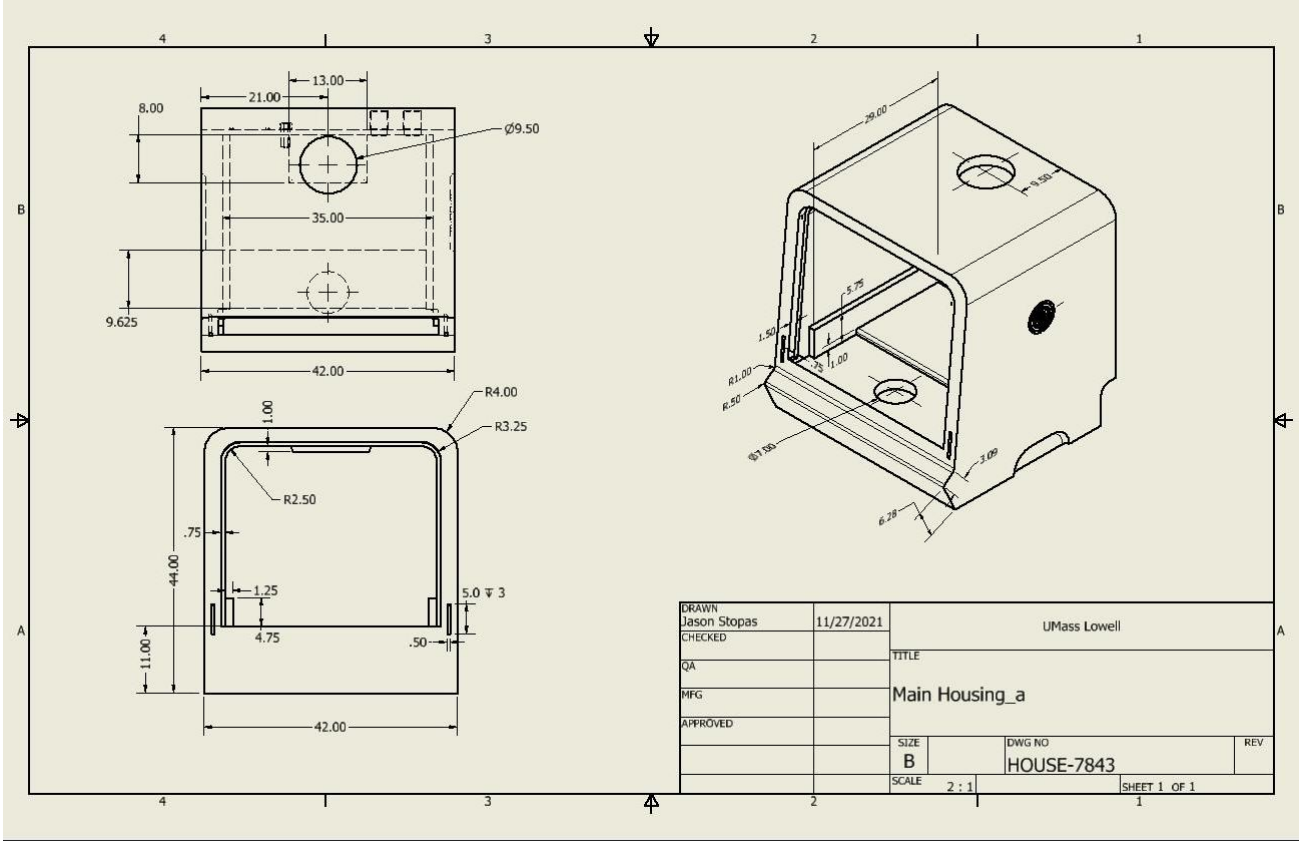
DRAWN Jason Stopas	11/26/2021	UMass Lowell
CHECKED		TITLE: COUNTERTOP DISHWASHER SUB-ASSEMBLY_a
QA		
MFG		
APPROVED		
SIZE B	DWG NO DISH - M9478a	REV 1
SCALE 3 : 1	SHEET 1 OF 1	

- <u>BILL OF MATERIALS SUB-ASSEMBLY 1a</u>

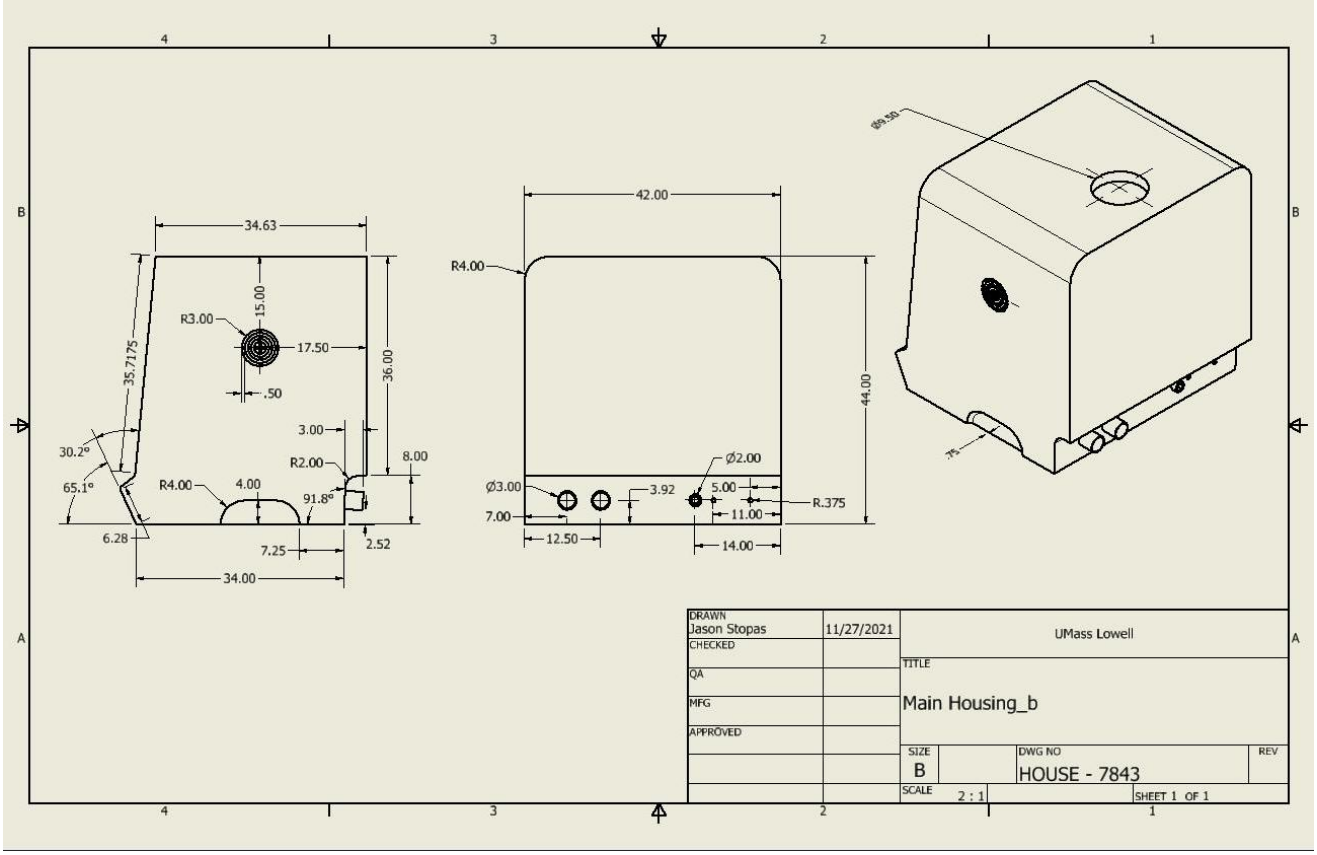
	A	B	C	D	E	F
1	Item	Part Number	Thumbnail	BOM Stru	Unit QTY	QTY
2	1	Main Housing		Normal	Each	1
3	2	Main Spray Arm		Normal	Each	2
4	3	DomeLightHousing		Normal	Each	1
5	4	Top Spinner		Normal	Each	1
6	5	System Filter Holder		Normal	Each	1
7	6	Fill Cap		Normal	Each	1
8	7	DishBasket2		Normal	Each	1
9	8	Silverware Tray		Normal	Each	1
10	9	Gasket		Normal	Each	1
11	10	self contained water tank		Normal	Each	1

- PARTS 1-10: SUB-ASSEMBLY 1a

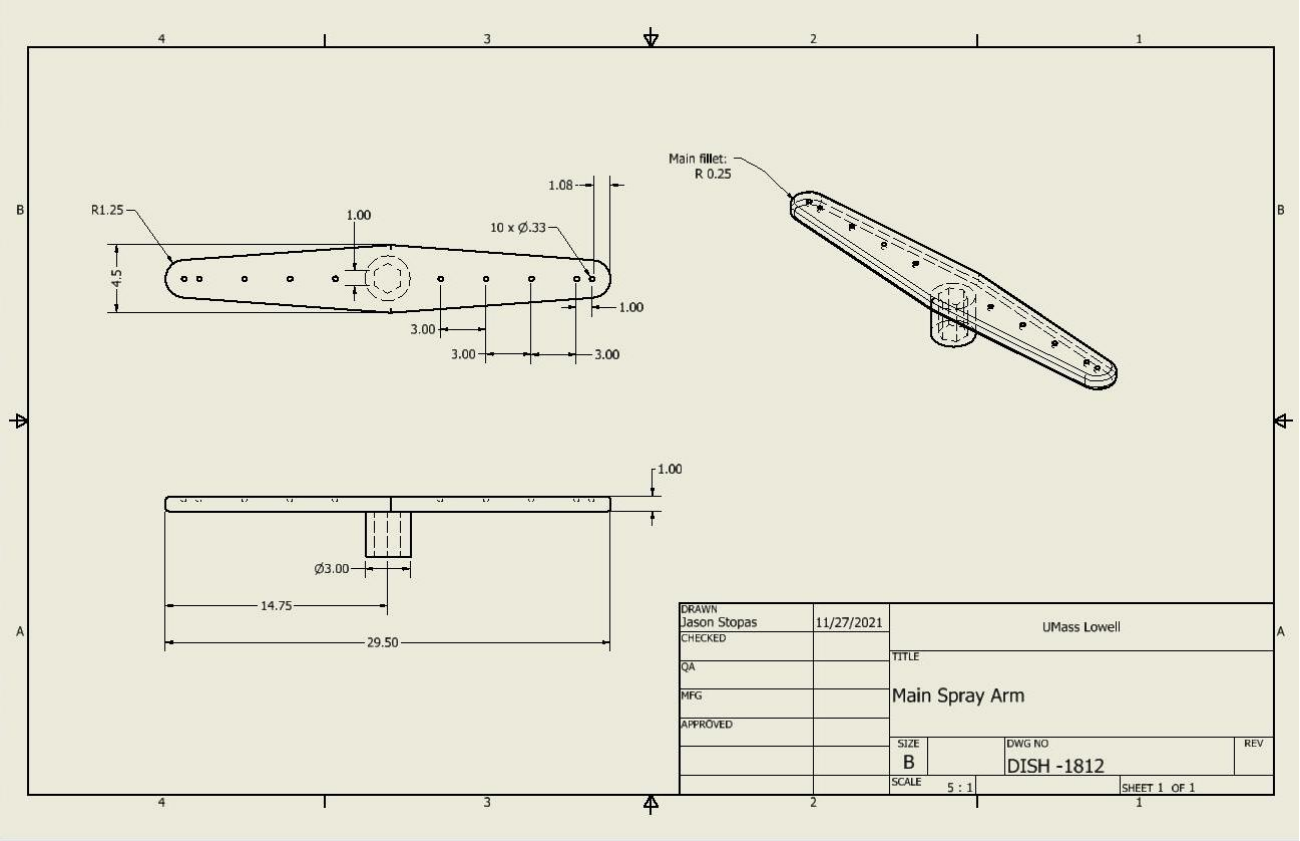
- Main Housing view(s) a [part 1.sub-assembly 1a]



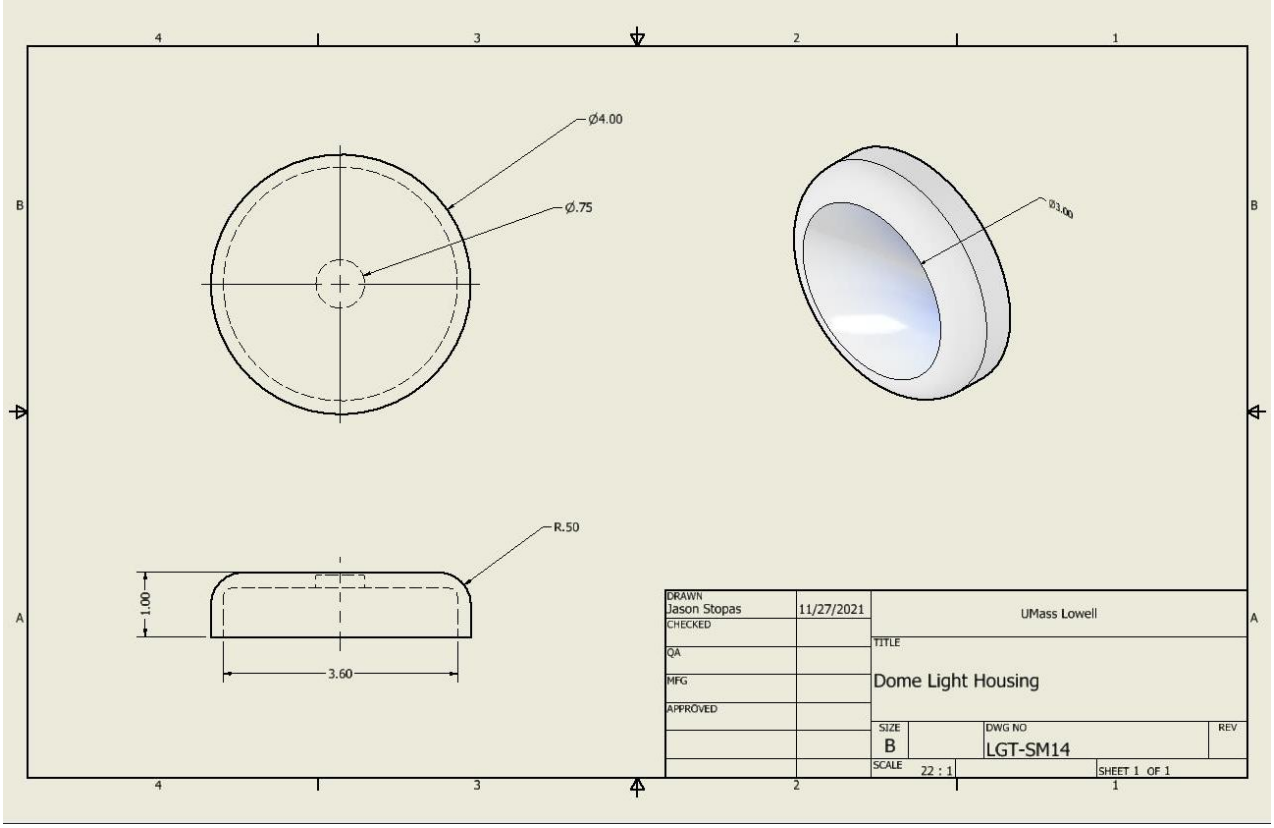
- Main Housing view(s) b [part 1.sub-assembly 1a]



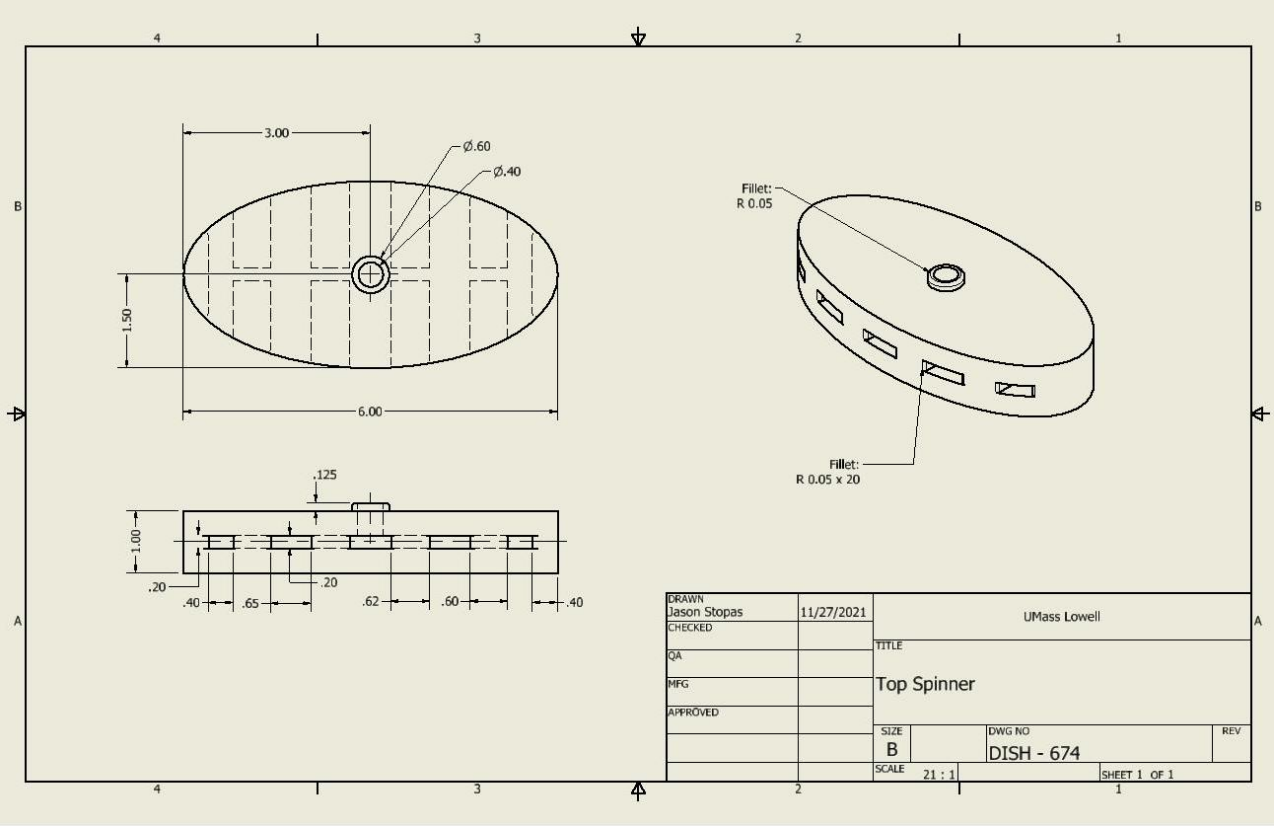
- Main Spray Arm [part 2.sub-assembly 1a]



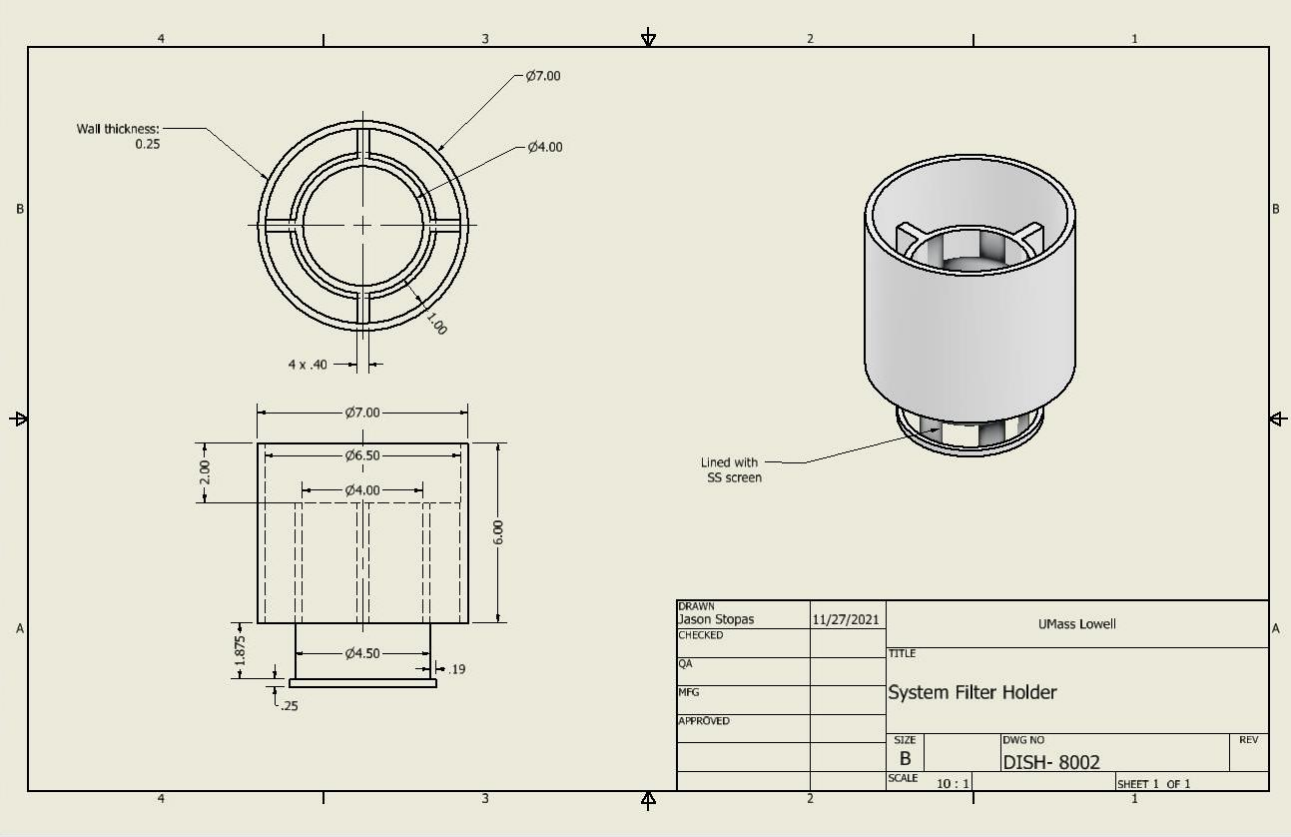
- Dome Light Housing [part 3.sub-assembly 1a]



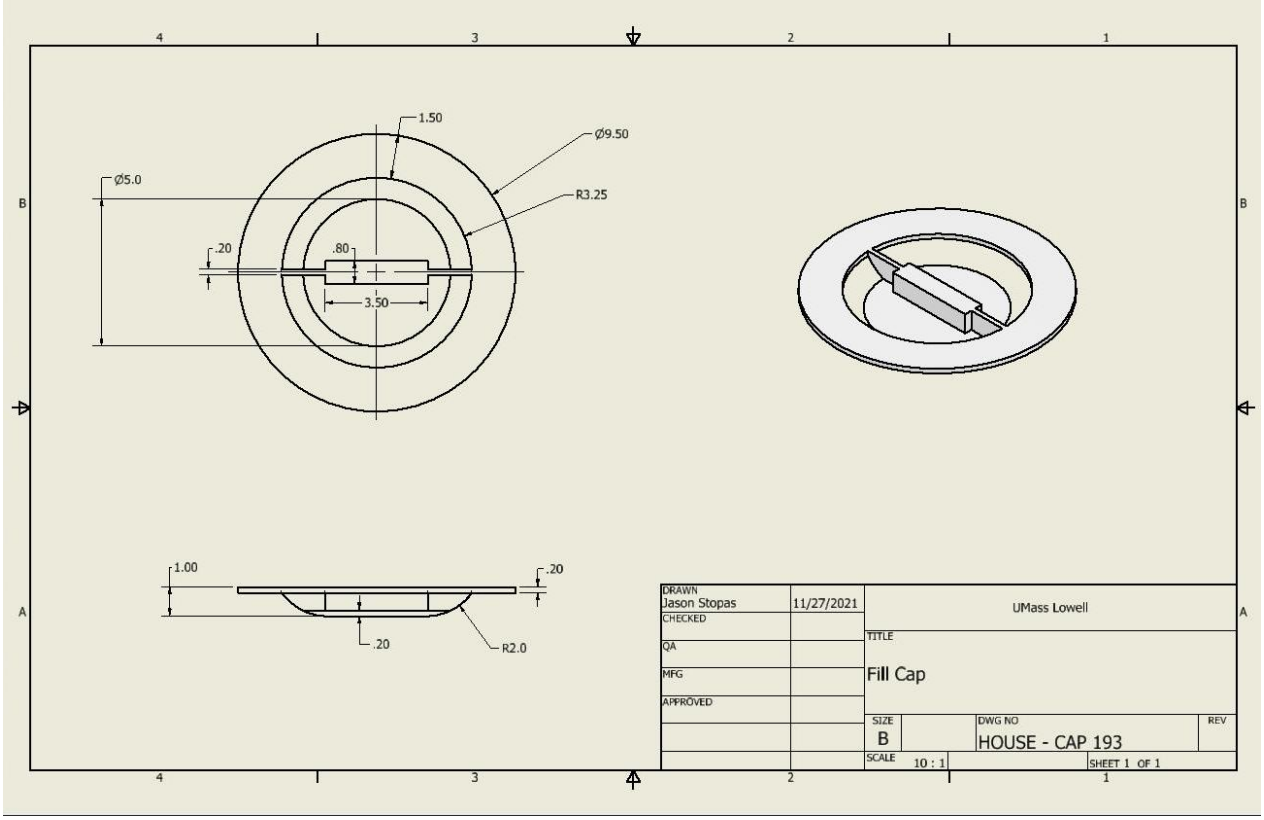
- Top Spinner [part 4.sub-assembly 1a]



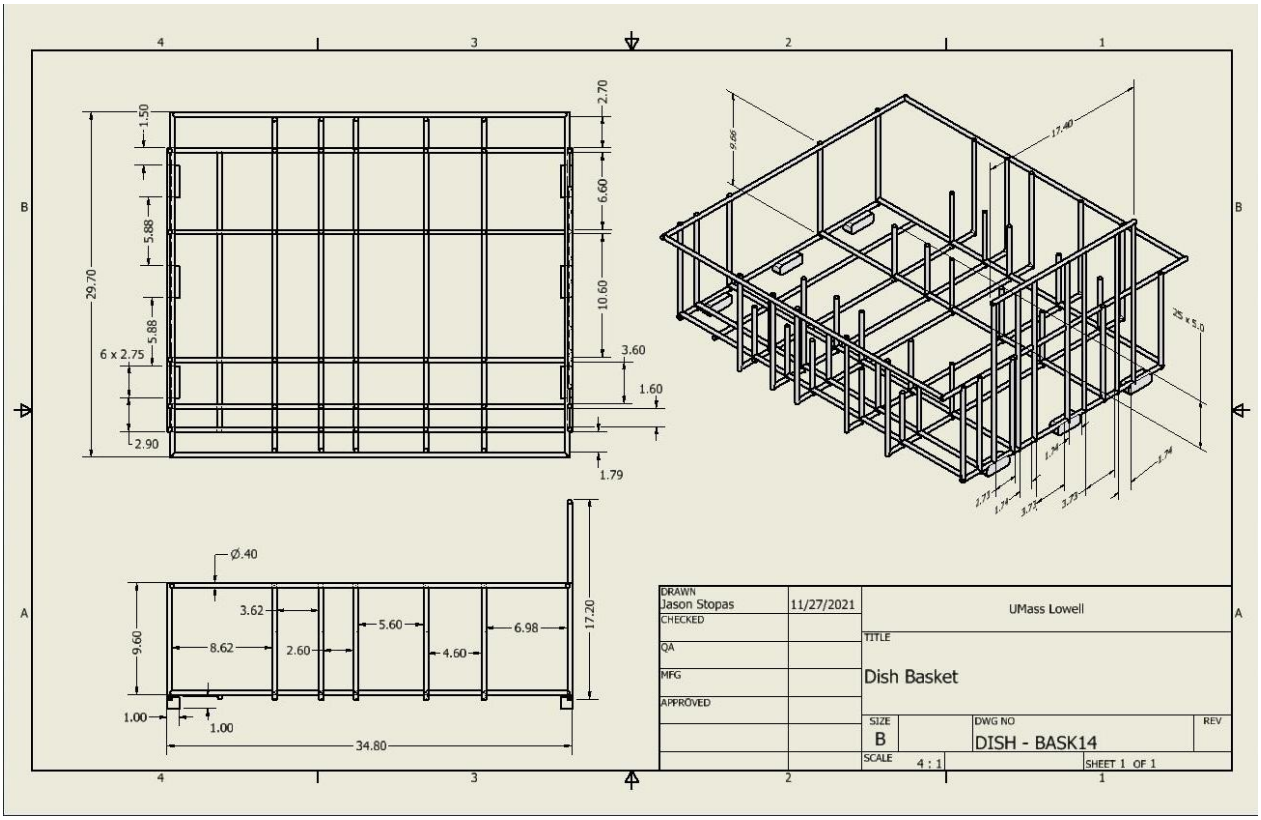
- System Filter Holder [part 5.sub-assembly 1a]



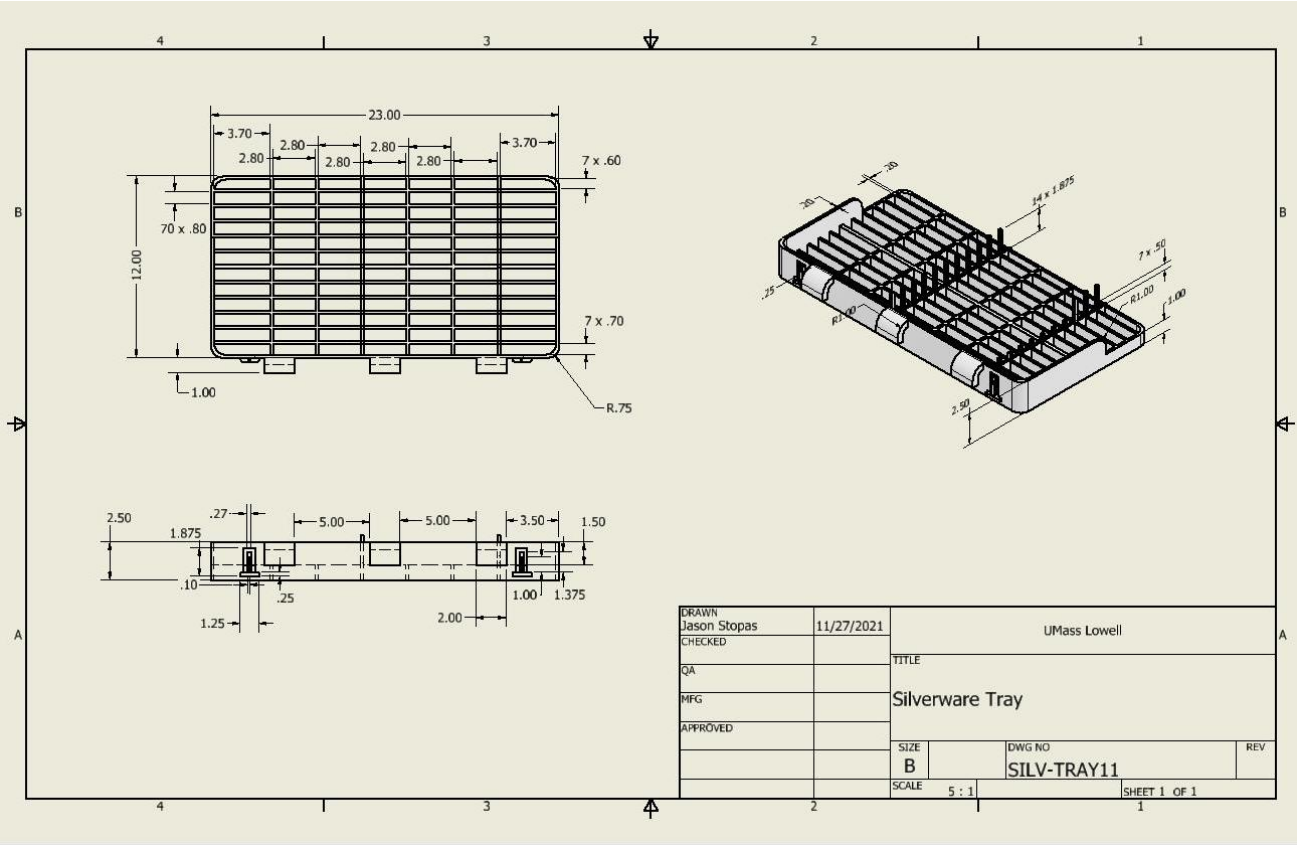
- Fill Cap [part 6.sub-assembly 1a]



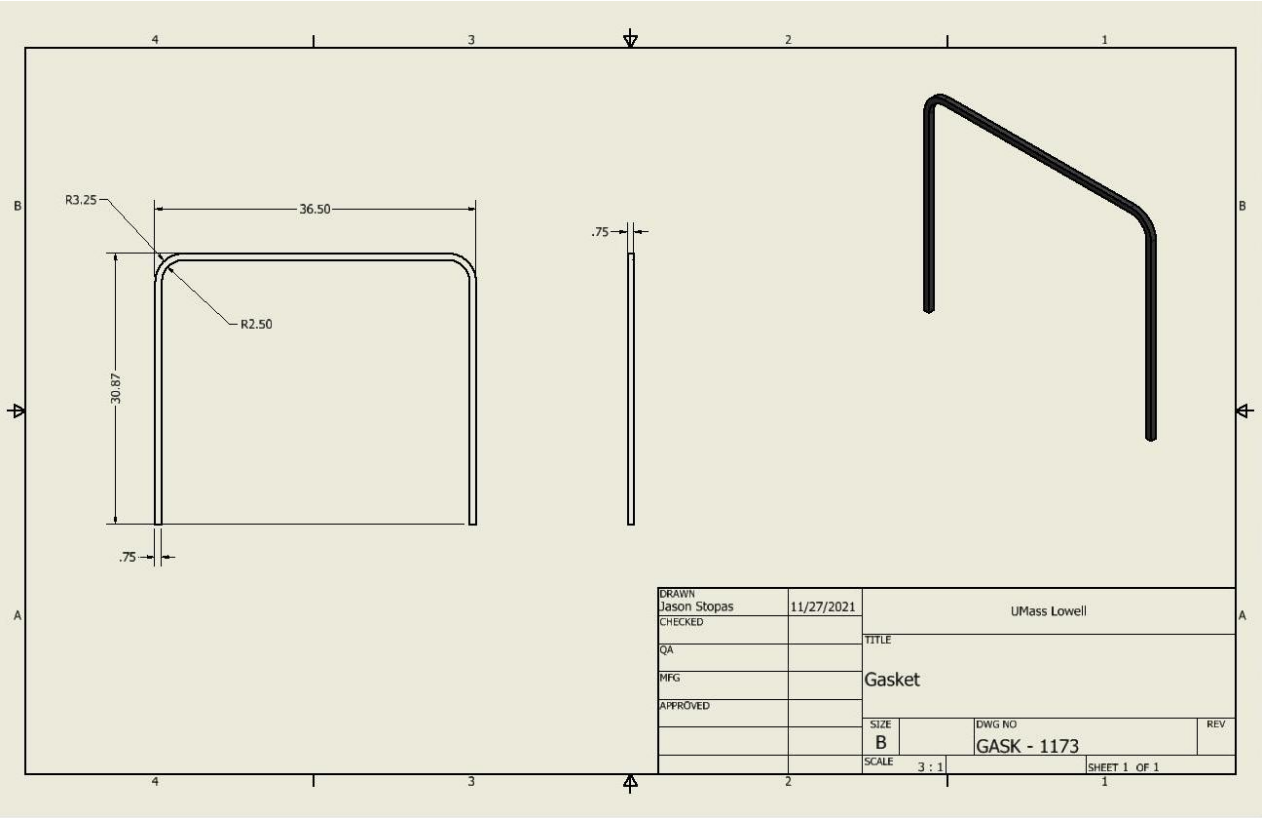
- Dish Basket [part 7.sub-assembly 1a]



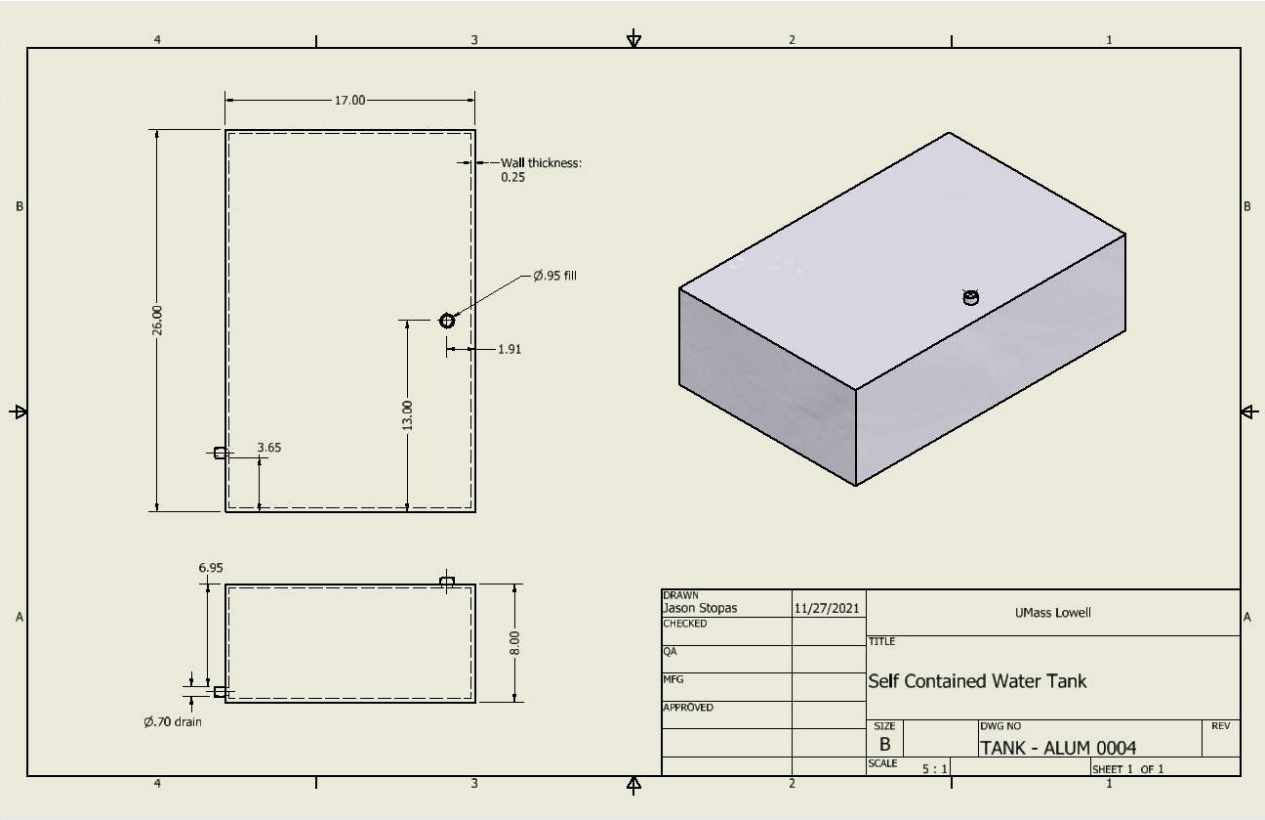
- Silverware tray [part 8.sub-assembly 1a]



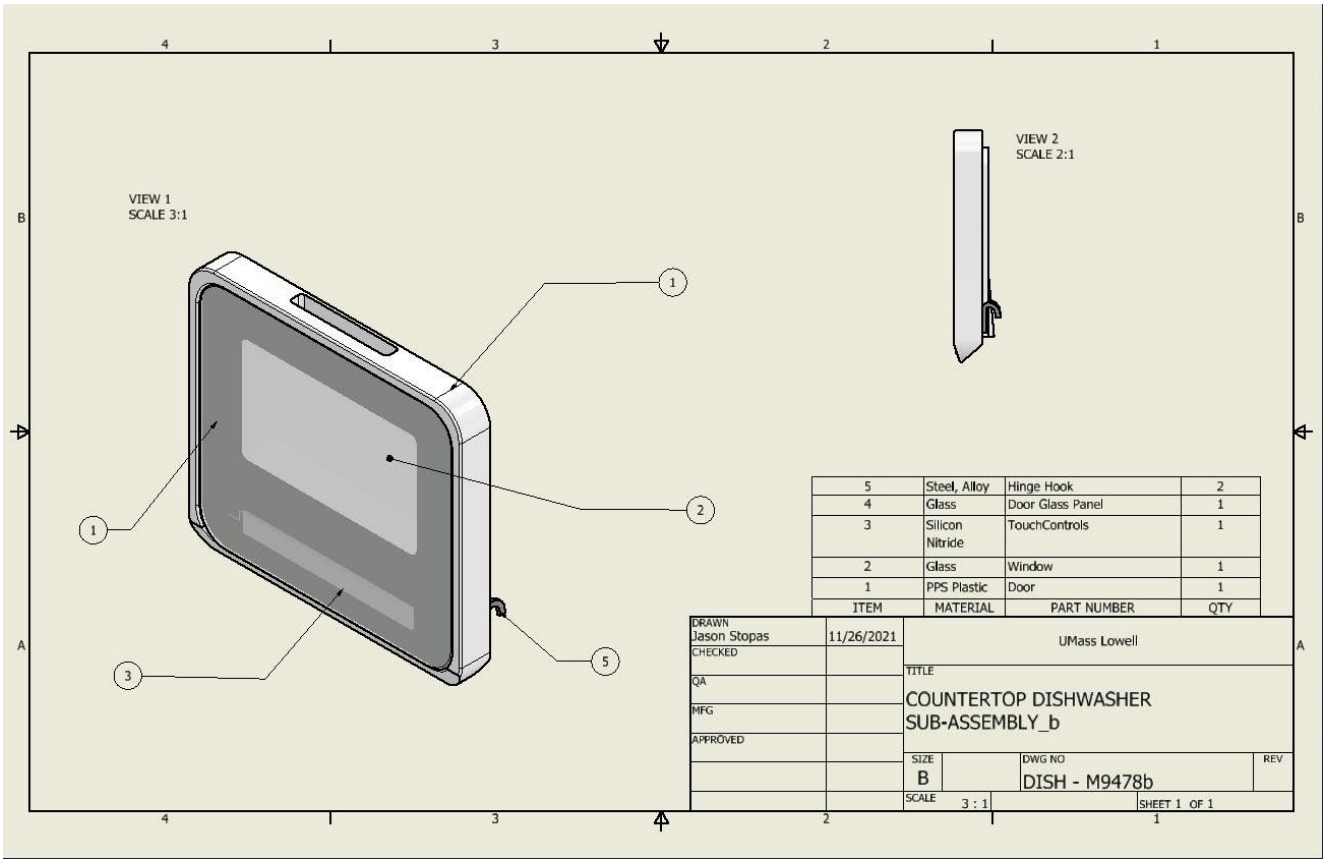
- Gasket [part 9.sub-assembly 1a]



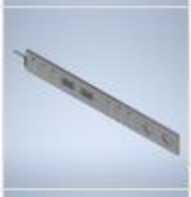
- Self-contained Water Tank [part 10.sub-assembly 1a]



- <u>SUB-ASSEMBLY 1b</u>

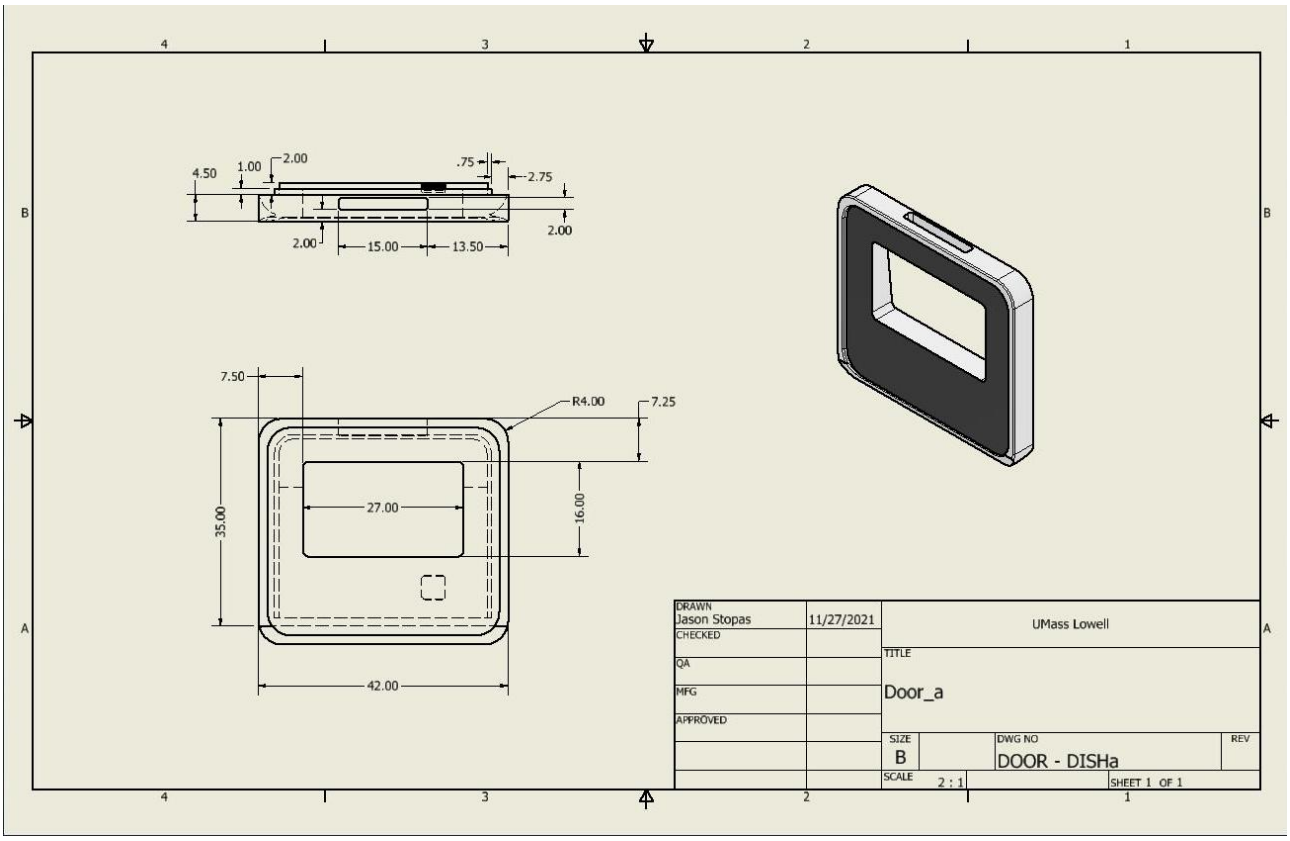


- <u>BILL OF MATERIALS SUB-ASSEMBLY 1b</u>

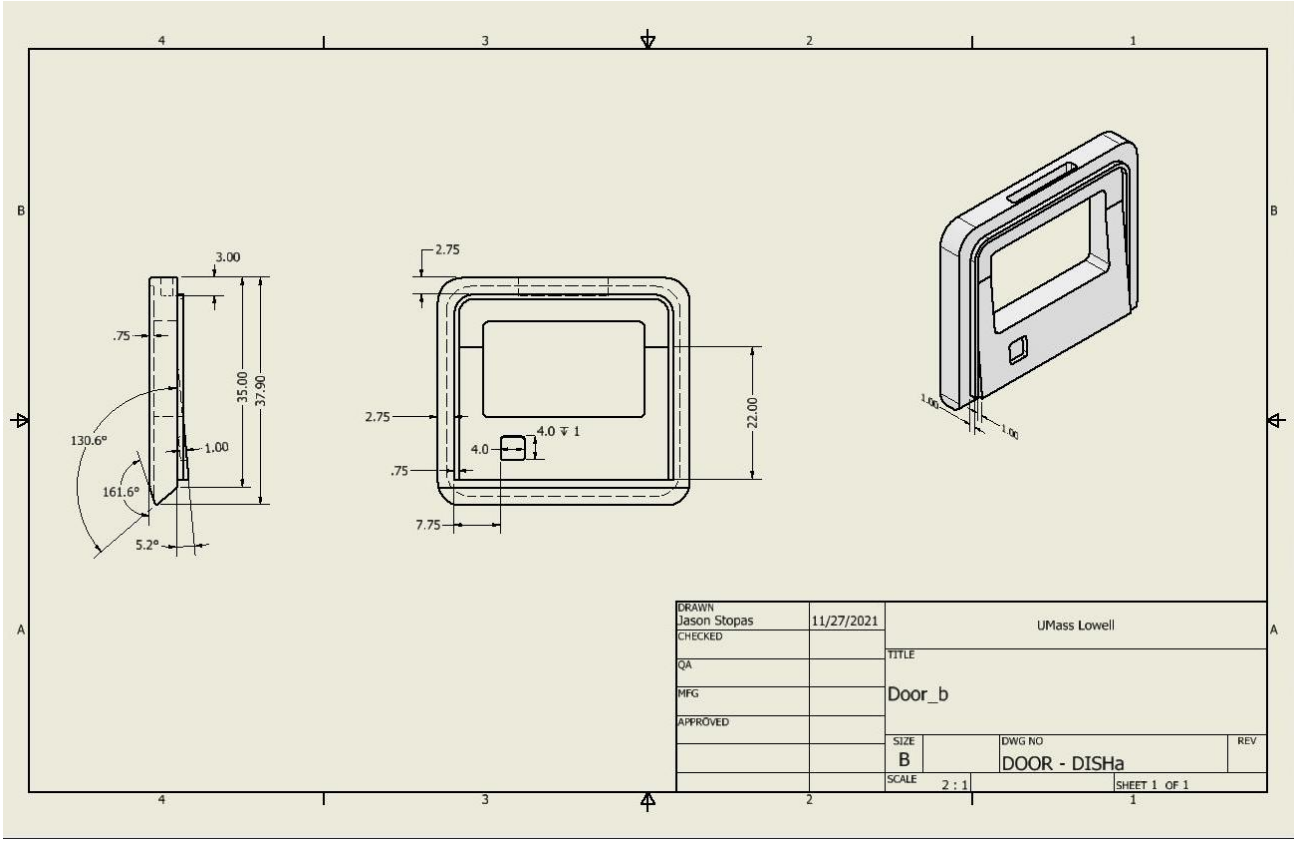
	A	B	C	D	E	F
1	Item	Part Number	Thumbnail	BOM Struc	Unit QTY	QTY
2	1	Door		Normal	Each	1
3	2	Window		Normal	Each	1
4	3	TouchControls		Normal	Each	1
5	4	Door Glass Panel		Normal	Each	1
6	5	Hinge Hook		Normal	Each	2

- <u>PARTS 1-5: SUB-ASSEMBLY 1b</u>

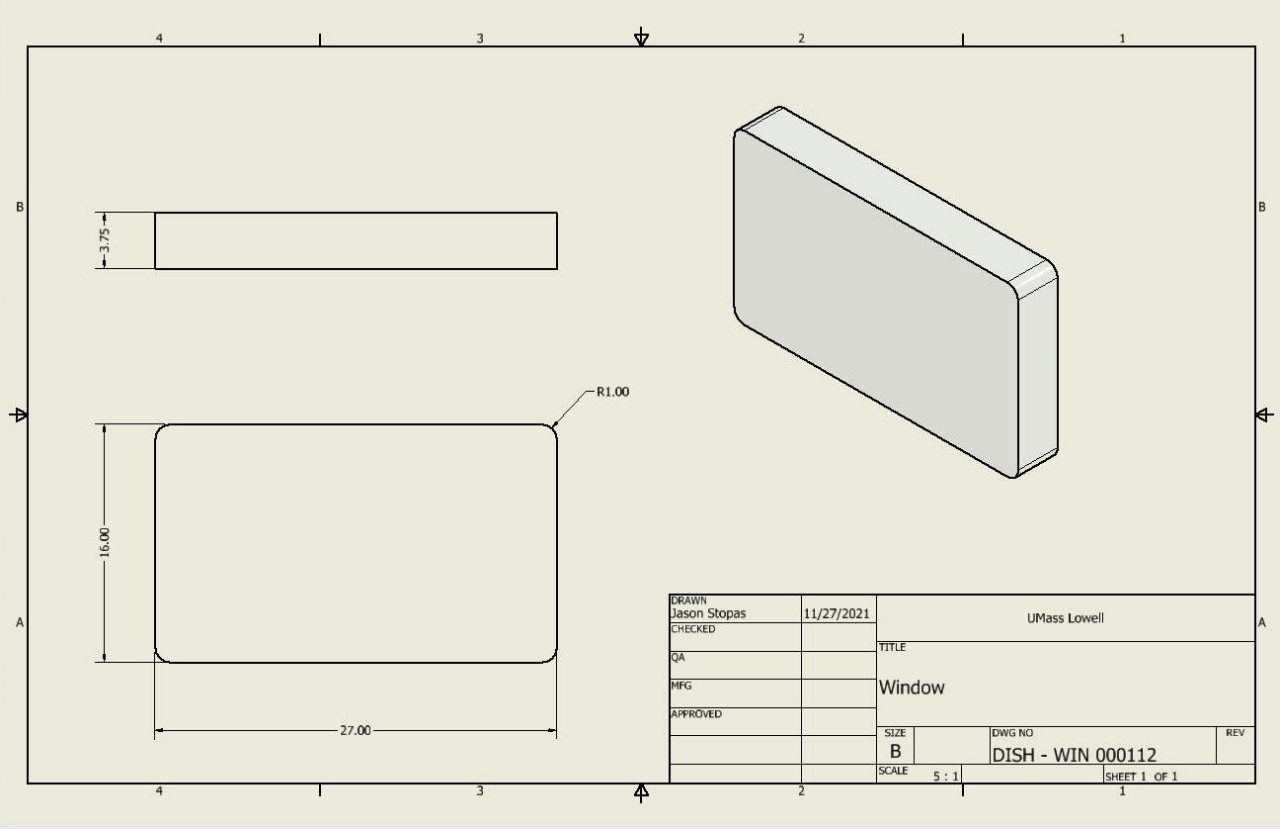
➢ Door view(s) a [part 1.sub-assembly 1b]



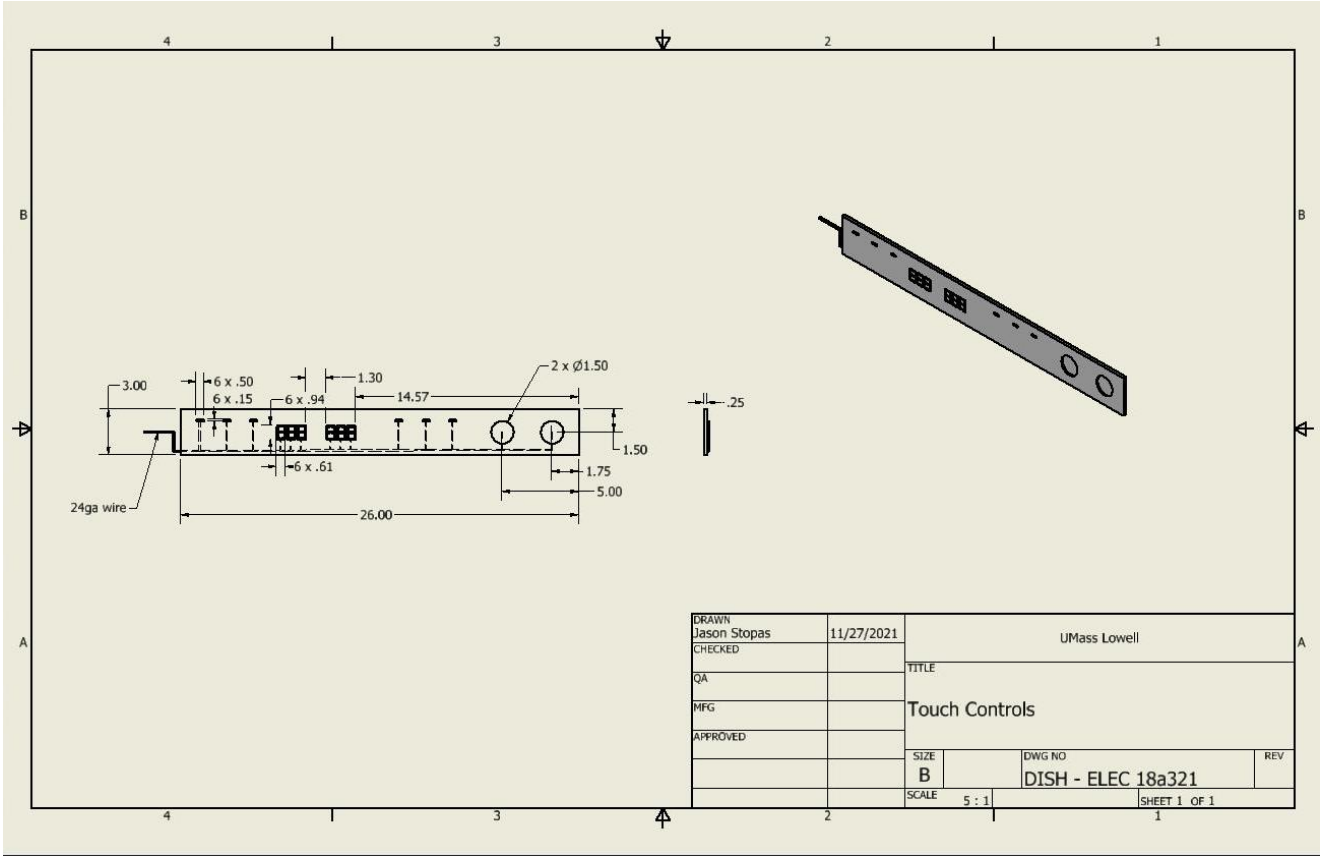
- Door view(s) b [part 1.sub-assembly 1b]



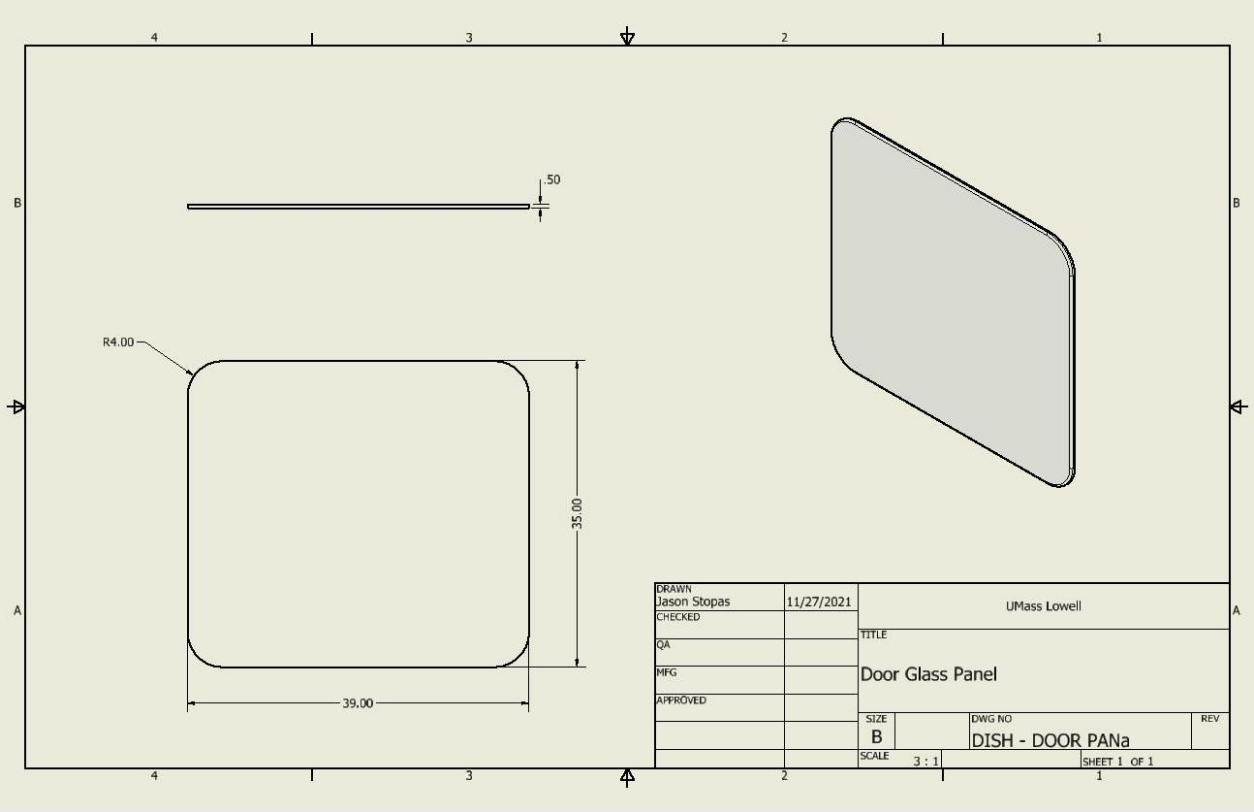
- Window [part 2.sub-assembly 1b]



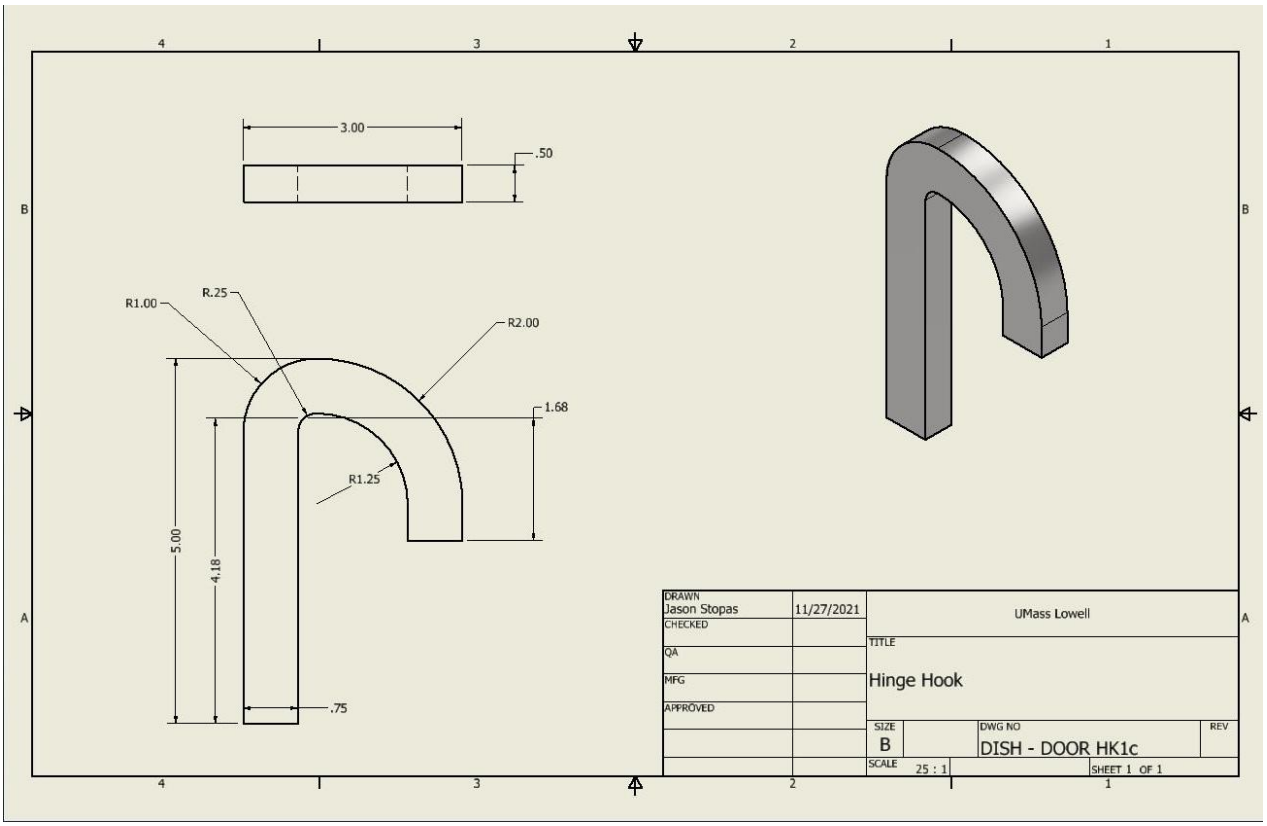
- Touch Controls [part 3.sub-assembly 1b]



- Door Glass Panel [part 4.sub-assembly 1b]



- Hinge Hook [part 5.sub-assembly 1b]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SHEET 1 OF 1

- Semester Project Proposal (submitted on 9/26/21)

1) I've decided to work independently on this project, mostly due to my schedule but also the coordination of assembling a team in an online class environment. Therefore, team members for this project include 1) Jason Stopas. The name of my team is Kitchen Lifestyles for the Apartment Dweller. There are a lot of niche products for this demographic both in the US and International markets as the cost/per sq ft of housing continues to grow dramatically with no immediate indication of a reversal. This category of alternate, smaller scale kitchenware and appliances can apply to college students, city dwellers, anyone interested in tiny house type dwellings, RV/trailers/vans, liveaboards, other vagabond type lifestyles, and almost anything in-between.

2) The appliance I propose, for the purpose of this project, is a Portable Countertop Dishwasher with a self-enclosed water tank. For those who do not already have a dedicated dishwasher in their dwelling unit, not only is this appliance convenient, the item also facilitates sanitation and good health practices due to the ability to heat the dishware to 158F in between uses (something you can't do washing dishes by hand).

3) Note: This is not original design, this item exists. I plan to model the AutoCAD Inventor drawings after one that is already manufactured by Farberware, Inc. (This gives me something to draw). Although the item seems straightforward it is certainly made of many components. Completion of this project will undoubtedly stretch my current drafting abilities and will also require myself to cross into yet unlearned territory with the AutoCAD Inventor software to be

successful. (The drawings we have completed up to this point, week 4, have all been very simple small parts.

4) Drawings to include.

a) full assembled product

b) housing

c) front door

d) dish rack

e) silverware tray

f) bottom water jet rotary/spray arm

g) top waterjet rotary/spray arm

h) heater element

i) washing pump

j) fan

k) drain pump

l) electronic controls

m) wiring harness

n) water tank

o) optional kitchen faucet attachment

p) drain attachment