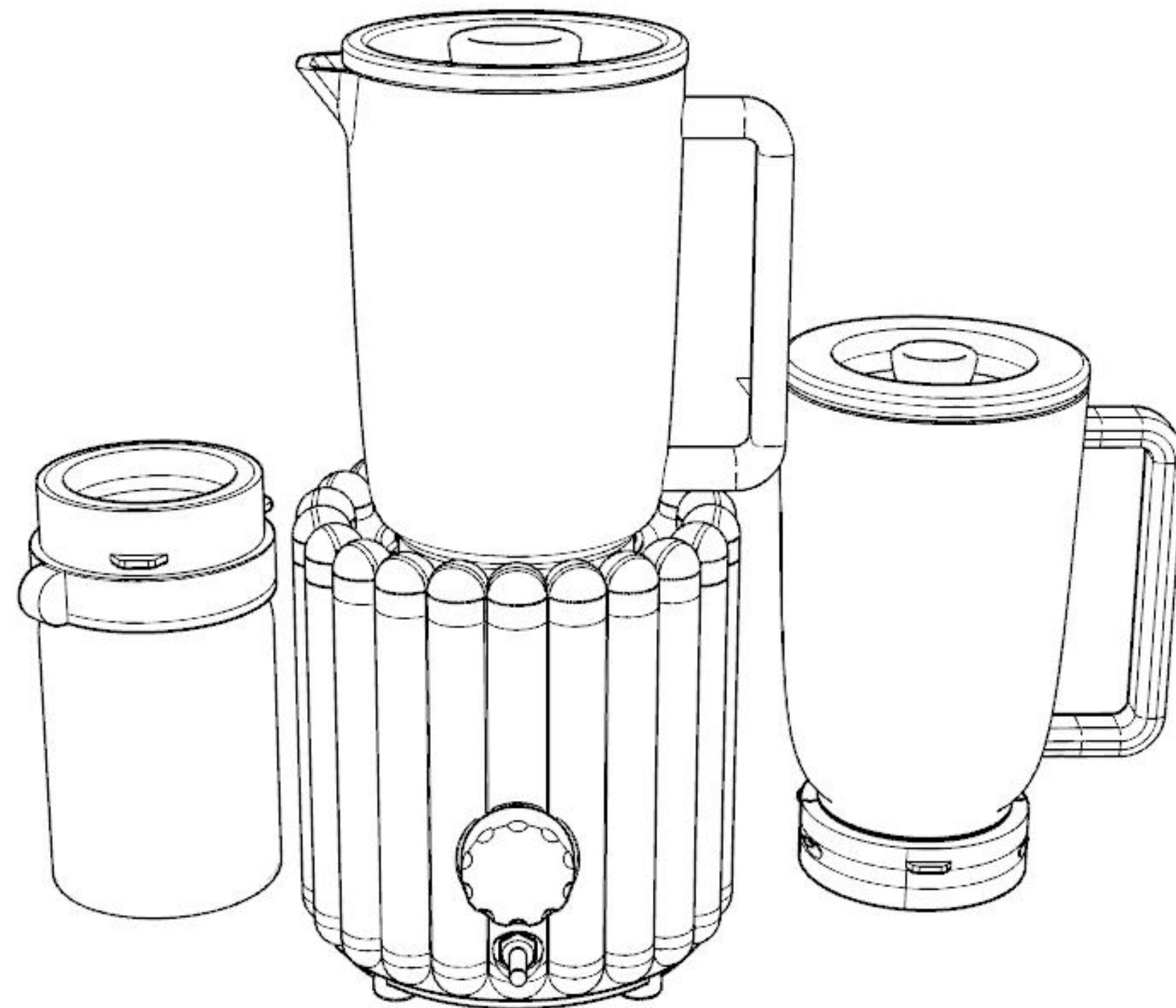


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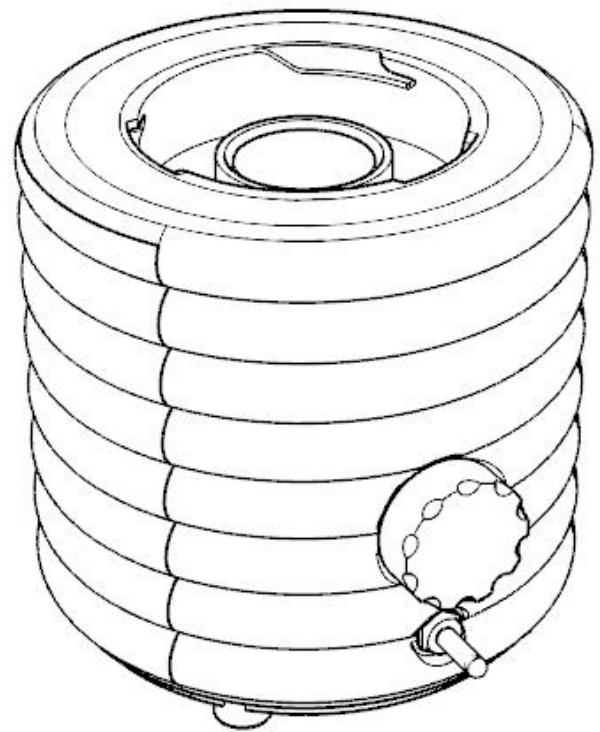
# BlenDO

## Production Manual

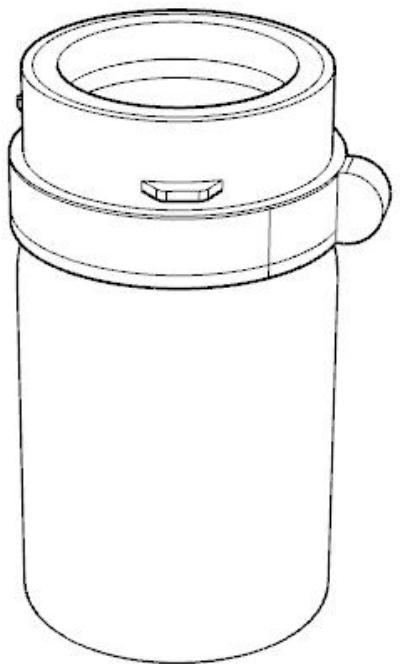
Open source Kitchen Blender



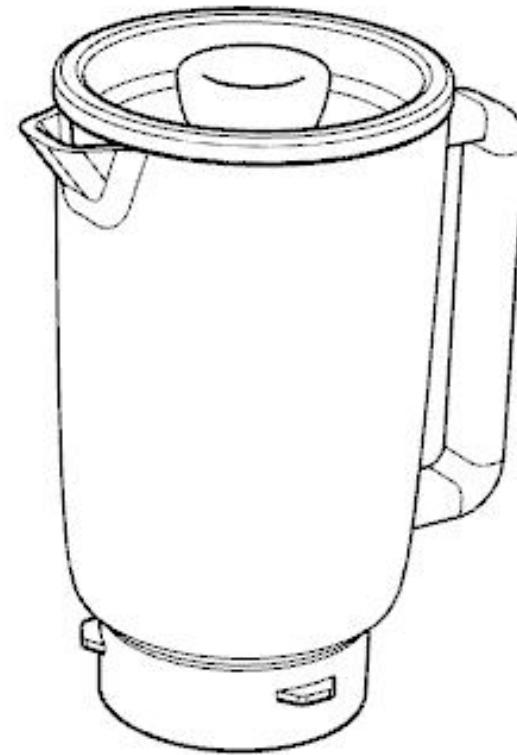
## LEVELS SCHEME



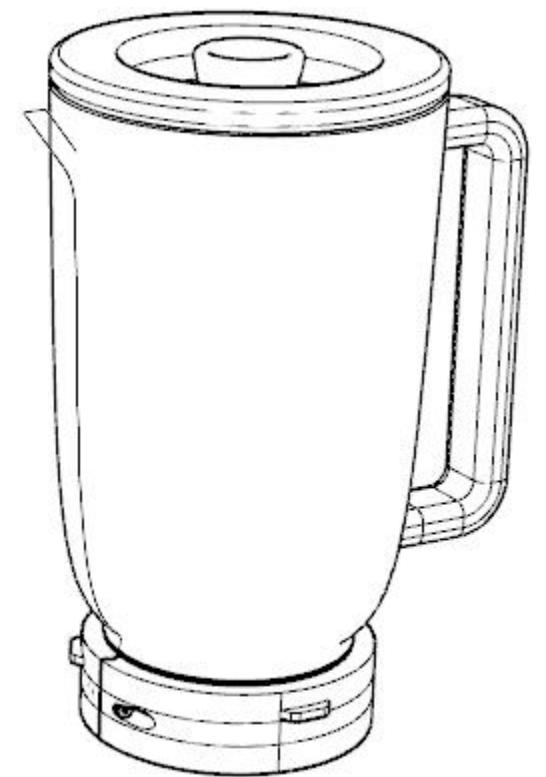
BlenDO Blender Base



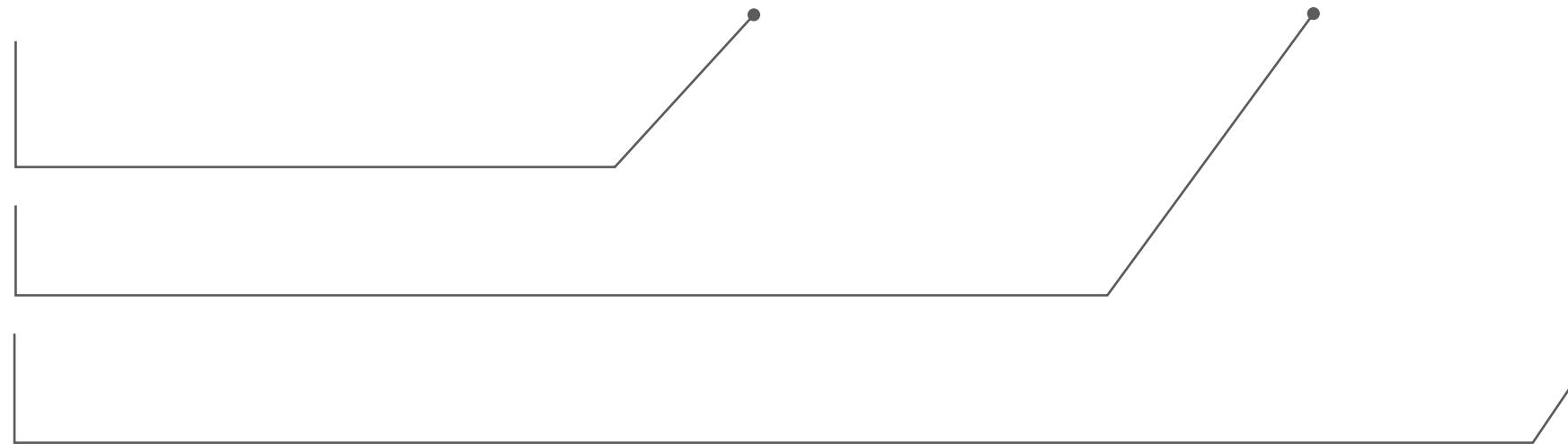
Level 1



Level 2



Level 3



# INTRO

BlenDO is an open-source kitchen blender project that empowers users to construct their own blender using provided files. This customization includes choosing filament colours, various patterns, and button configurations from the available options in the file.

BlenDO comprises three progressive stages, each demanding increasing construction effort.

Initially, building the base case is essential across all stages. Subsequently, users can select different levels based on difficulty and personal preferences:

- Level 1: Integrates a container design compatible with standard jar containers.
- Level 2: Involves 3D printing with food-safe materials, adhering to recommended guidelines.
- Level 3: This advanced level focuses on artistic creation, requiring users to craft their own pitcher using clay. Although it demands more time, it offers the highest degree of customization.

By using the provided file, you have the opportunity to craft your own blender and become part of the vibrant open-source community. Sharing your experience with others not only allows you to showcase your creation but also contributes valuable insights that can inspire and help fellow enthusiasts.

Whether you're a beginner or an experienced builder, the open-source ethos encourages continuous learning and exploration, ensuring that each blender created is a unique expression of craftsmanship and innovation.

# SAFETY INSTRUCTIONS



- For safety, never operate the motor without its enclosure and supervision. Only power on the blender after securely fastening the enclosure screws. Always ensure that the blades are covered by one of the containers.

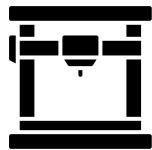
## FOOD SAFE PRINTING

Follow these guidelines before commencing food-safe 3D printing:

- Use Food-Safe Filaments:  
Ensure that the filament you use is specifically designated as food safe. This typically means it complies with regulations such as FDA (Food and Drug Administration) guidelines for food contact materials.
- Print after cleaning your nozzle  
Before printing with food-safe filaments, thoroughly clean your printer nozzle to prevent any potential mixing of non-food-safe filaments into your blender components.
- Print Settings:  
The extruded material is circular in cross-section, which leaves very narrow crevices in between layers with a depth directly proportional to layer height. It is recommended in any case to print at the lowest feasible layer height for food safe parts. 3D print needs to have a smooth surface.
- Food safe 3D printing filaments include PLA, PP, co-polyester, PET, PET-G, HIPS, and nylon-6, as well as some brands of ABS, ASA, and PEI. Check this website for food-safe filament brands. [Link](#)

## Machines

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3D printer



laser cutter  
(optional)

## Tools

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pliers



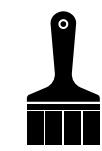
philips head  
screwdriver



soldering  
equipment



cable  
stripper



brush



basic ceramic  
forming equipment

## Materials

---



Food-safe PETG  
510gr



ASA filament  
730 gr



Food-safe Epoxy



3kg  
Handbuilding  
Earthenware  
Clay



50 mL Transparent  
Glaze



4mm MDF Board  
60cm x 85cm

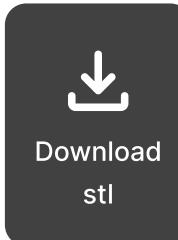


Wood Glue

# BOM List - CUSTOM PIECES

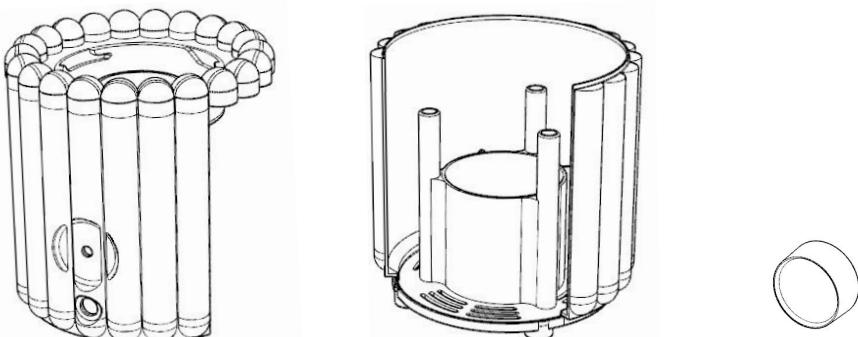
## 3D Prints

If you don't have a 3D printer, look for a local Fablab, a local maker or you can order online.



### Base

395gr ASA



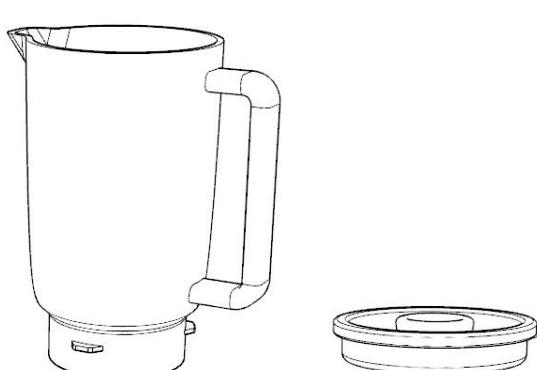
### Level 1

100 gr PETG



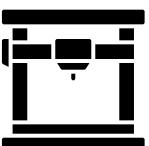
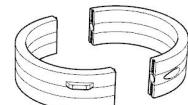
### Level 2

410 gr PETG



### Level 3

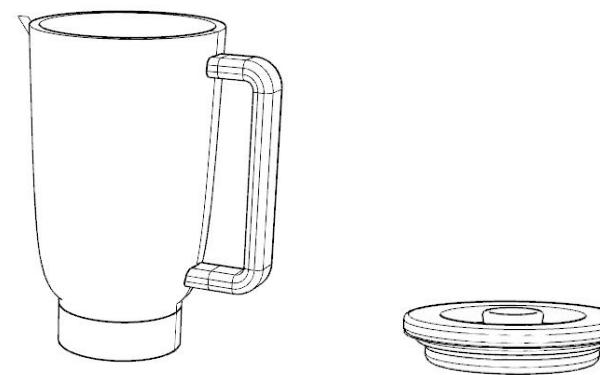
35gr ASA



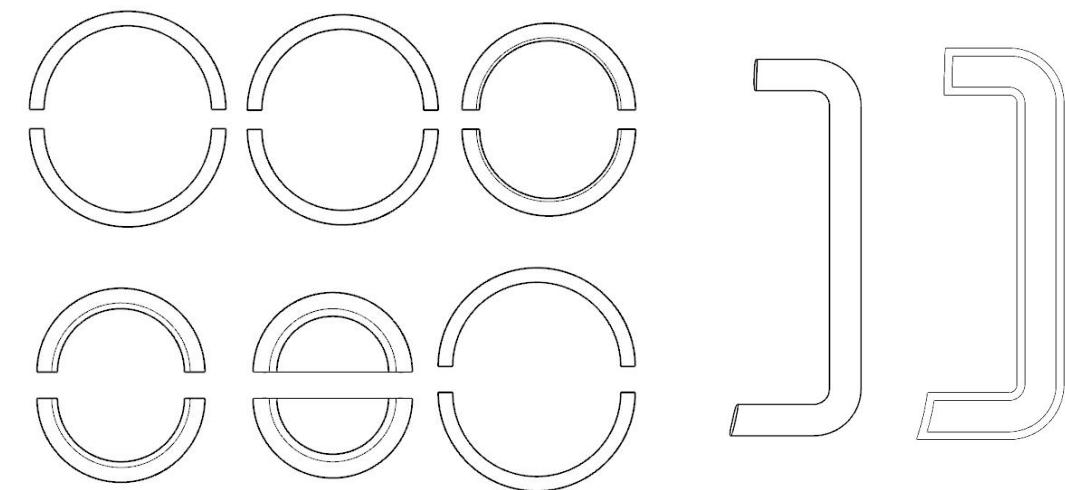
- Print Base components from ASA or ABS filament. ASA filament is recommended. All other pieces; especially pieces having contact with food; with FDA approved food safe PETG filament.
- After downloading the files (3D print section above) print the pieces with 0.4 nozzle.

## Ceramic Pieces

3kg Handbuilding Clay



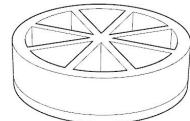
## Laser Cut



For a laser cutter, look for a local Fablab or a local maker. Alternatively you can order online.

# BOM List - STANDARDIZED PIECES

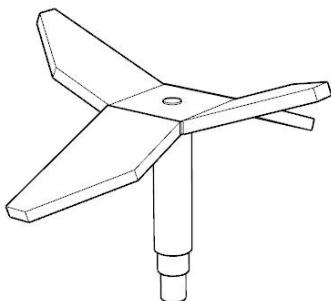
## Mechanic parts



Motor gear  
 $\varnothing = 47\text{mm}$ ,  $h = 10\text{mm}$



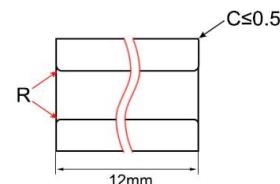
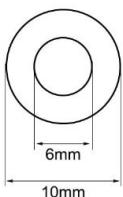
Blade gear - Shaft Blade Foot Seat  
 $\varnothing = 28\text{mm}$ ,  $h = 15\text{mm}$



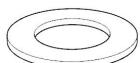
Stainless Steel 4 blades rod  
Blade:  $\varnothing \text{ max} = 58$  Height = 30 Shaft:  $\varnothing \text{ rod} = 8$   
 $L = 35$



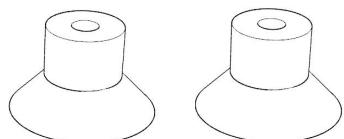
Blade seal - M6 Rubber Flat Washer Inside  $\varnothing = 6\text{mm}$ , Outside  $\varnothing = 13\text{mm}$ , 1.6mm Thick Sealing  
Spacer Gasket Ring



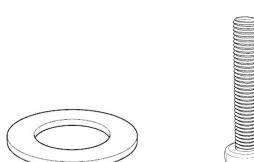
Bush- sourcing map Bearing Sleeve 6mm Bore x  
10mm OD x 12mm Length Self-Lubricating  
Sintered Bronze Bushings



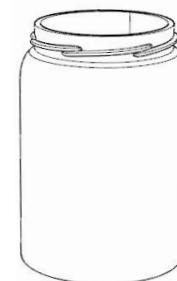
1X Washer - M5  
Inside Diameter 5.3mm  
Outside Diameter 10mm  
Thickness 1.0mm



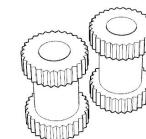
4 X Silicone Suction fet  
 $\varnothing \text{ outer} = 30$  H = 20 M4 thread = 11



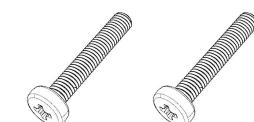
M3 screw+closed shape washer to  
hold mains



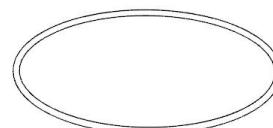
Glass Jar  
 $\varnothing \text{ mouth} = 78$   $\varnothing \text{ body} = 86$  H = 125 V=  
565 mL



3D Printing Brass Threaded Insert Nuts  
3X M3 h = 10mm  $\varnothing = 5\text{mm}$   
3D Printing Brass Threaded Insert Nuts  
3X M3 h = 6mm  $\varnothing = 5\text{mm}$



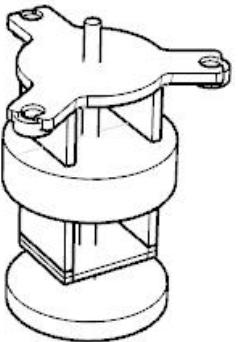
3X M3 screw h = 16mm  
3X M3 screw h = 8mm



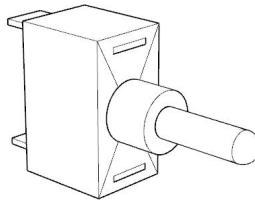
O-ring gasket,  $\varnothing = 75\text{mm}$

# BOM List - STANDARDIZED PIECES

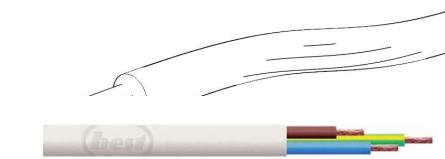
## Electronic parts



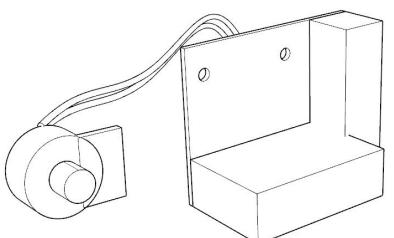
All-Copper 9530 Blender Multi-Universal Smoothie Soy Milk Motor



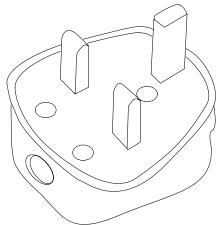
On-Off Latching Toggle Switch  
6.3mm Quick Connect Terminals  
12mm Panel Cut Out  
Voltage = 250 Volts  
Current rating = 15 Amps



Mains Cable - 3-Core Cable



Voltage Transformer Module  
Input Voltage: AC220V . Output Voltage : AC 50V to 220V. Max Power: 2000W. Max Current: 25A.  
Size: 47 x 35 x 27mm



Plug 13A Fused Mains Plug



Electric cables Ø = 1mm x 25cm

## BEFORE YOU START



Ensure that you 3D print all the necessary parts and order all standardized pieces.

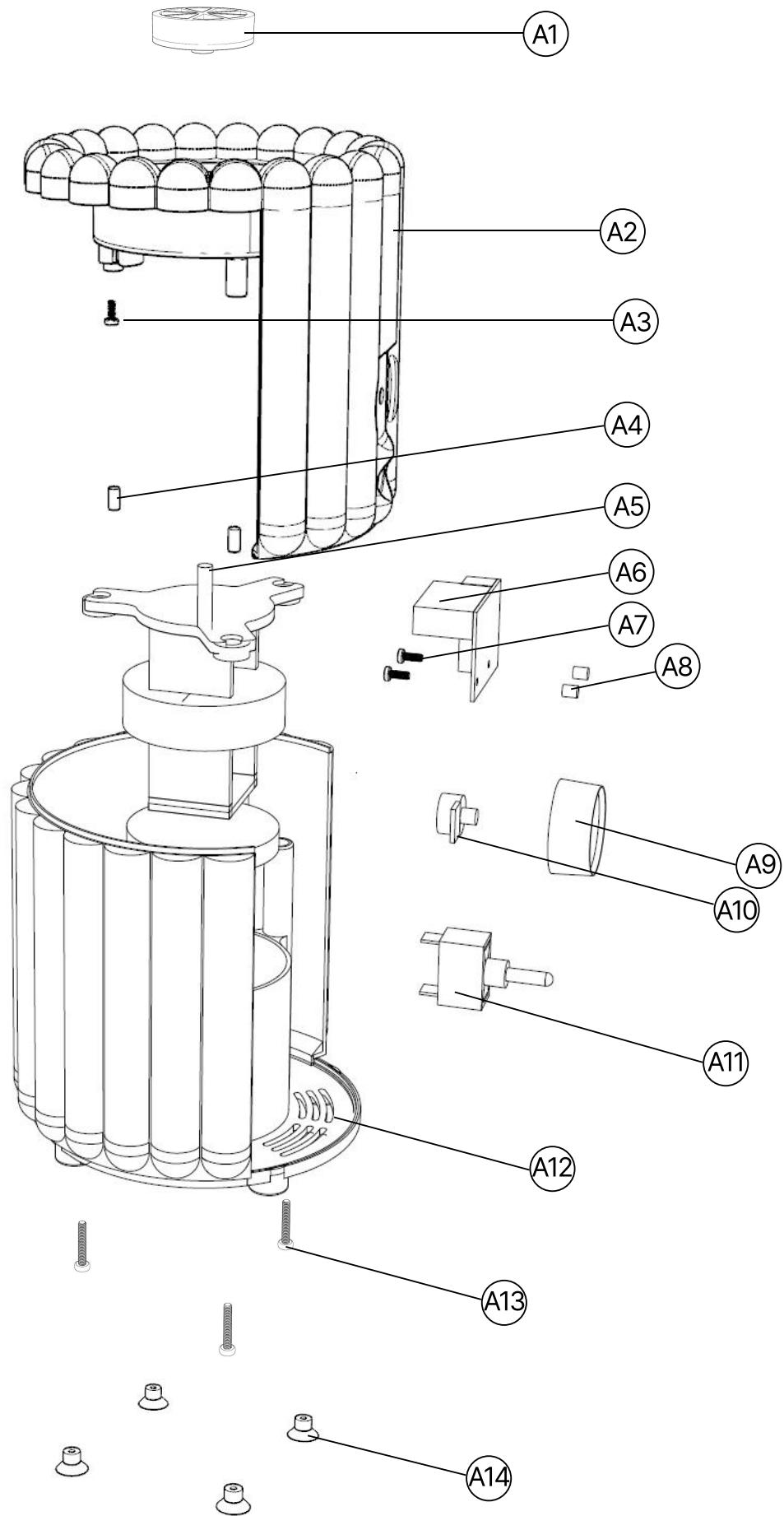


Apply a food-safe epoxy coating to the 3D printed pieces B1, C1, and C2 to prevent food particles from sticking.

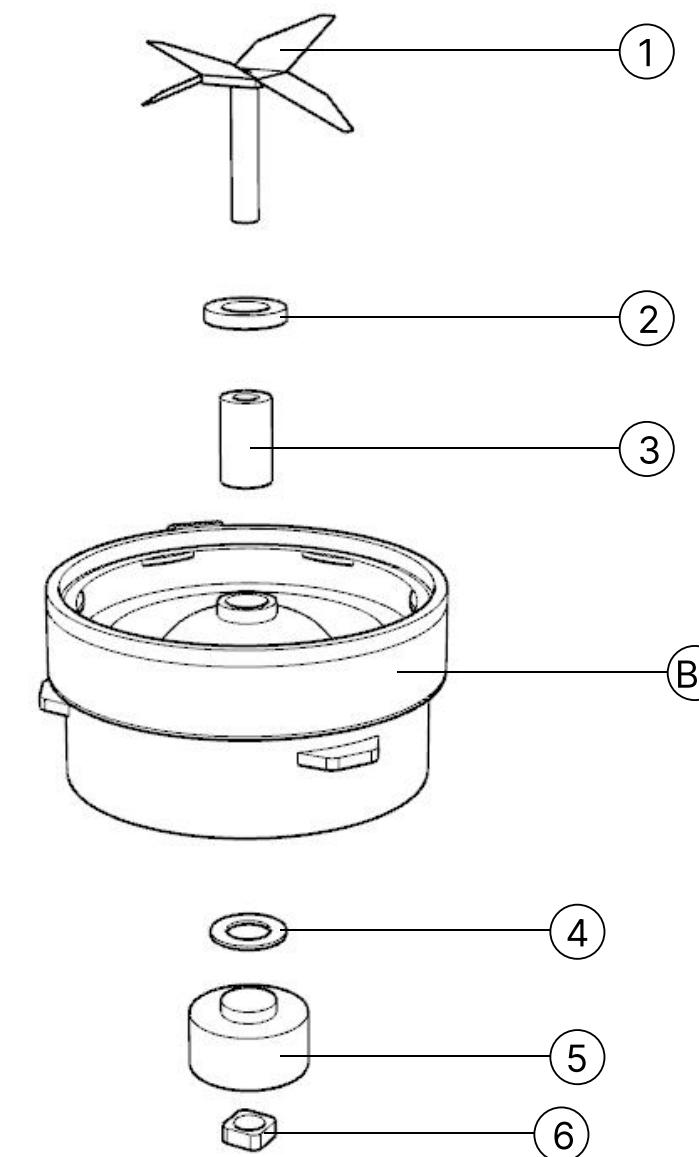


Before the start it is important for you to understand the whole process, take a look at the complete manual before you begin.

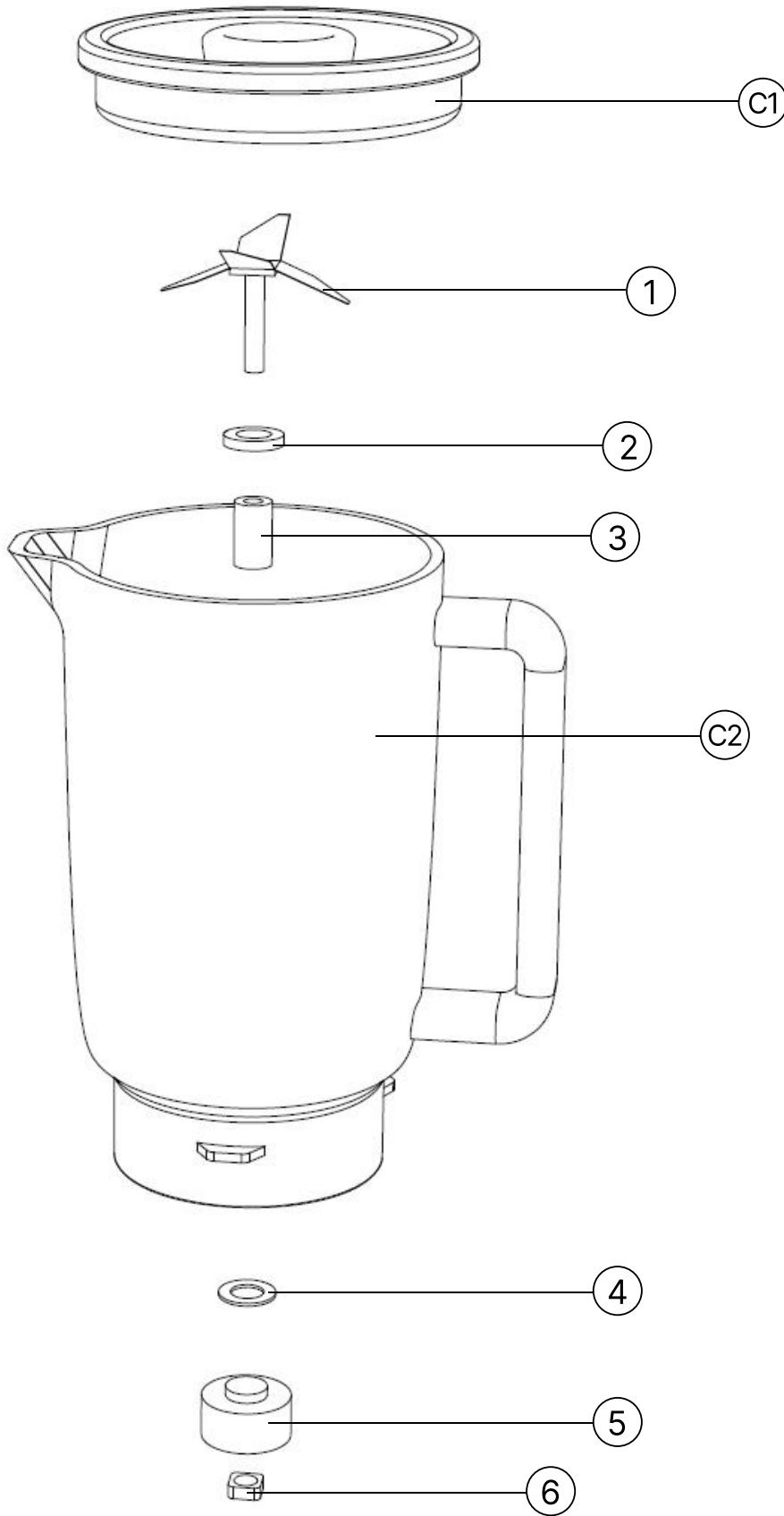
## BlenDo Blender Base



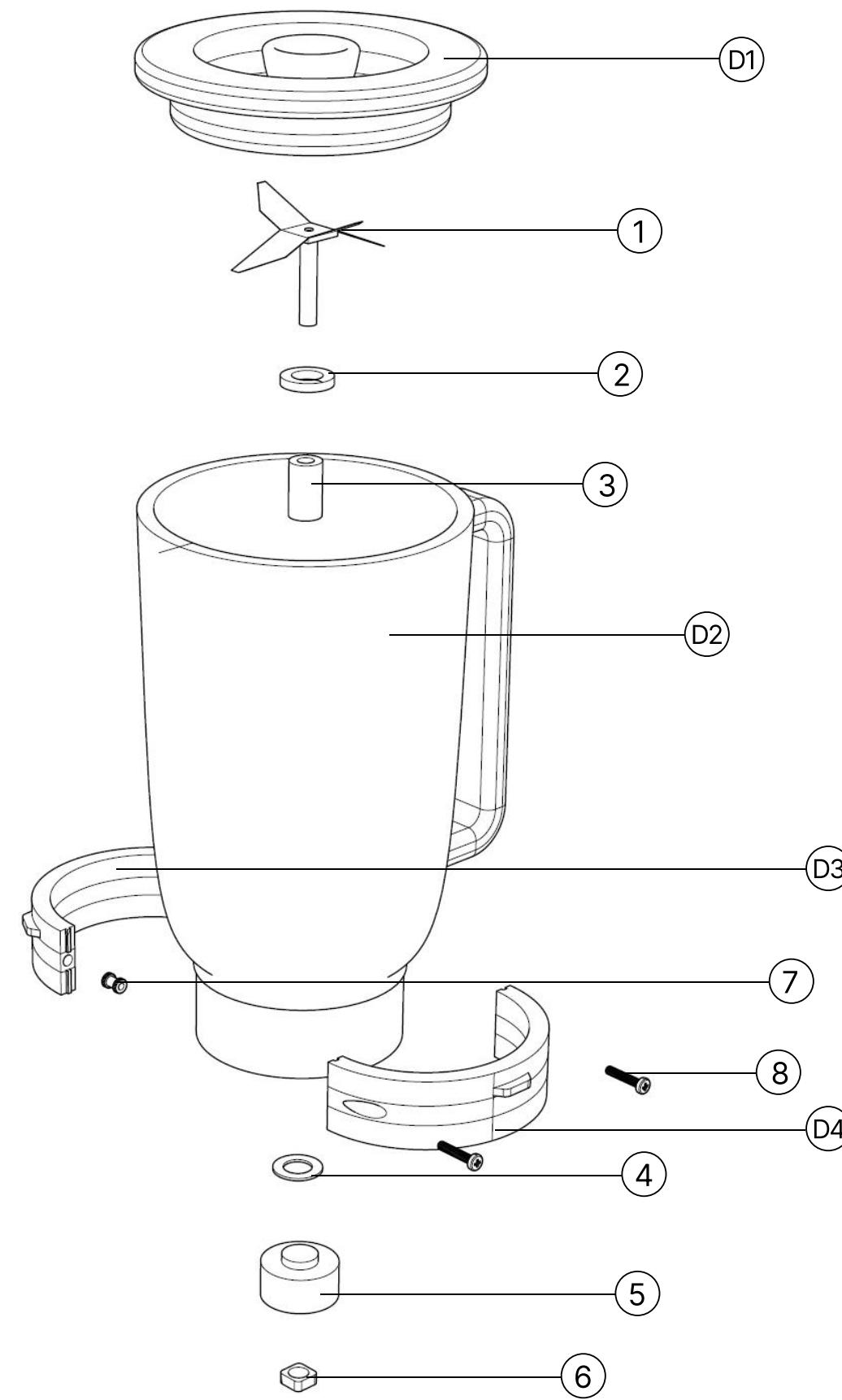
## Level 1 Jar Head Blade



## Level 2 3-D printed Pitcher



## Level 3 Ceramic Pitcher



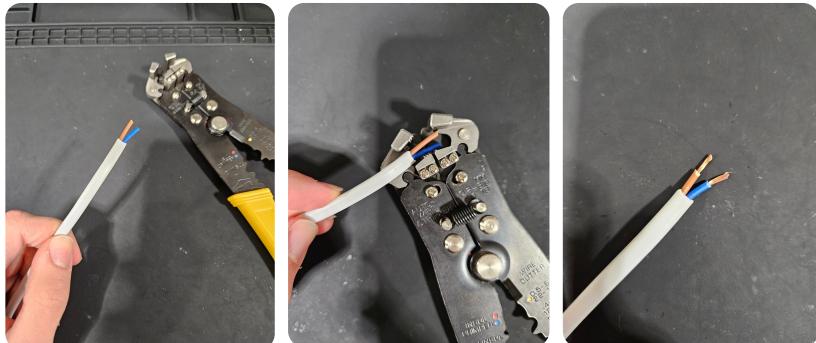
# ASSEMBLY INSTRUCTIONS

## 1# Making the BlenDO Blender Base

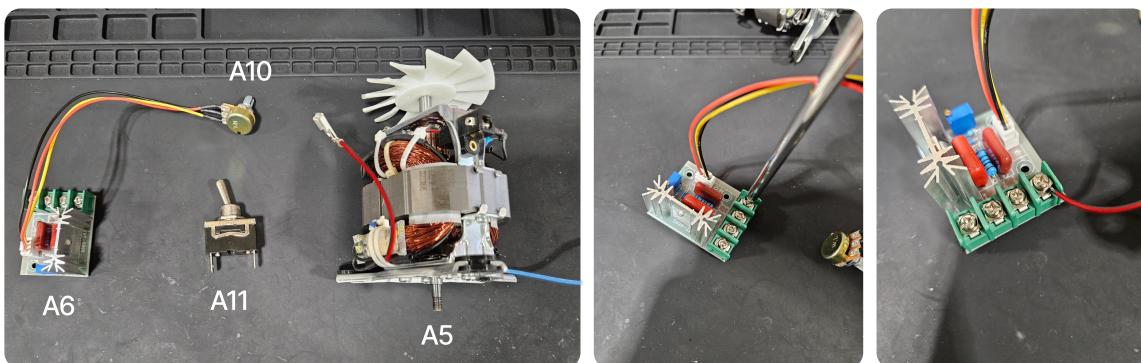
Tools needed:



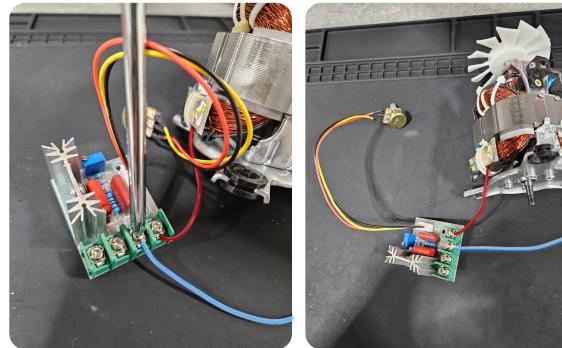
- Use a cable stripper to strip the insulation from the blue (neutral) and brown (live) cables.



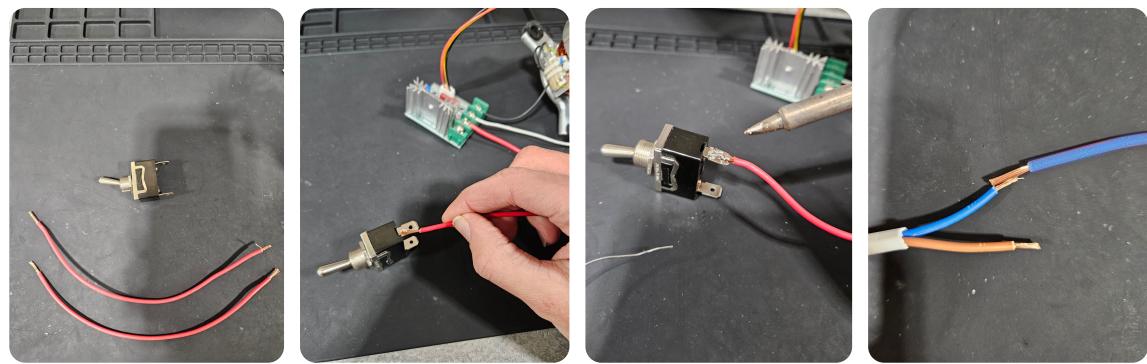
- Take the Voltage Transformer Module (A6 and A10 might already be connected in some brands; if not, start by connecting the transformer board to the control switch and the motor (A5).
- To connect the motor to the voltage transformer, unscrew the first screw from the right on the transformer. Insert the red cable from the motor into the screw, then tighten it back down, making sure the cable is securely in place.



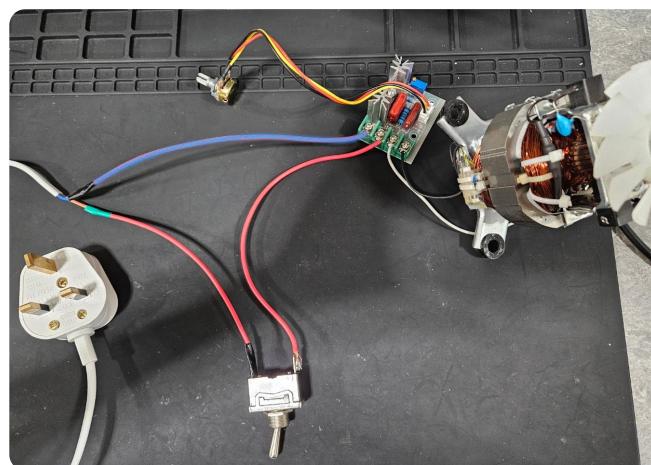
- Repeat the process of unscrewing and screwing with the blue cable. Attach the blue cable to the second screw from the right on the voltage transformer.



- Cut two red cables, each 11 cm long. Solder one cable to each side of the switch. Secure the OFF side of the switch to the third screw from the right on the voltage transformer.

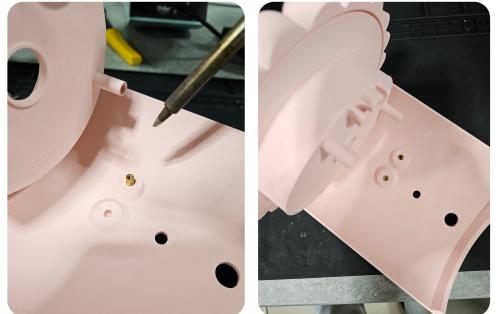


- Secure the ON side of the switch to the brown (EARTH) wire from the mains cable.
- Cut a 10 cm length of blue cable and solder it to the blue wire of the mains cable. Attach the other end to the first screw on the voltage transformer from the left. The final circuit should be configured as follows:



# ASSEMBLY INSTRUCTIONS

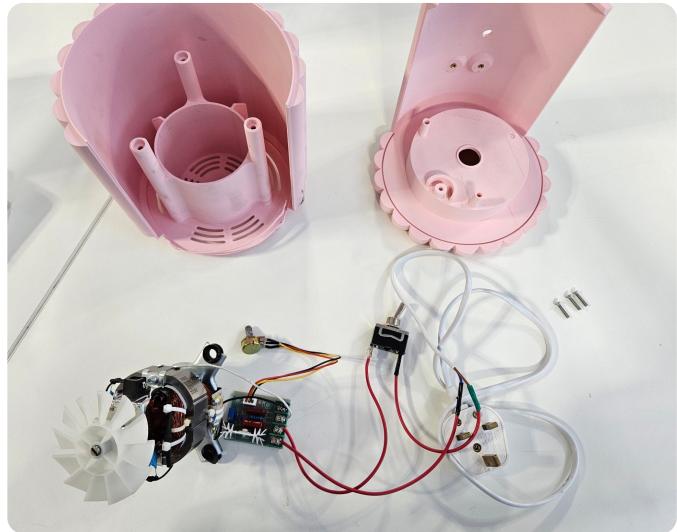
- Use a soldering iron to insert two M3 heat insert nuts, each with dimensions  $h = 6\text{mm}$  and  $\varnothing = 5\text{mm}$ .
- Repeat this process for the remaining three main heat insert nuts, each of which is M3 with dimensions  $h = 10\text{mm}$  and  $\varnothing = 5\text{mm}$ .



- Insert the transformer module rotary control switch (A10) through the designated hole onto the top 3D print (A2). Secure it in place by fastening it with an M6 hexagon nut.



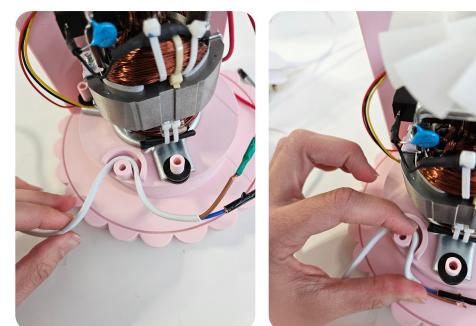
- All components are now prepared for the final assembly.



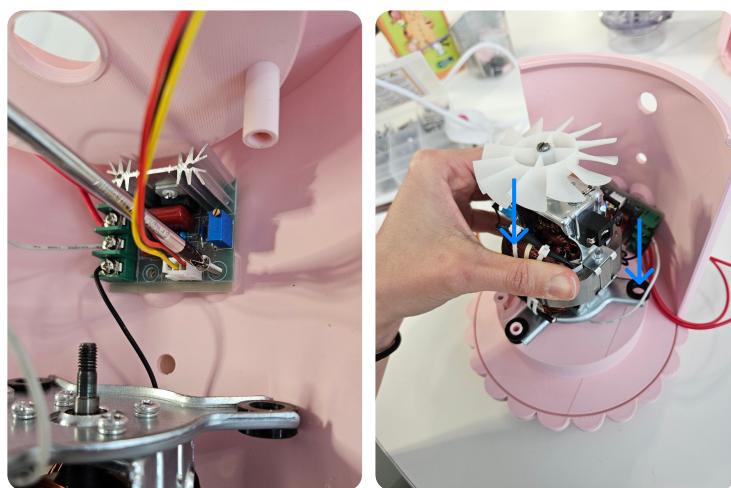
- Insert the latching toggle switch (A11) into the large hole on the top 3D print (A2). Secure it by fastening with an M11 hexagon nut.



- To secure the mains electric cable, position it as illustrated in the picture and use an M3 screw with a washer to fasten it in place.



- Secure the voltage transformer (A6) module onto the top 3D print (A2) using 2X M3×8mm screws (A7).
- Position the motor within the A2 piece as depicted in the picture.

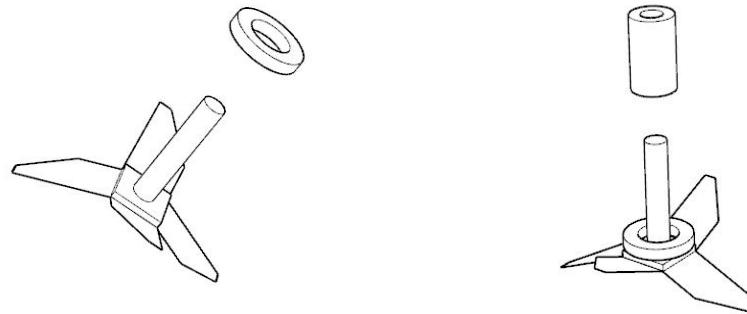


- Cover the top structure with the bottom 3D print (A12). Use 3X M3 screws with a length of 16mm (A13) to secure it into the three main holes. Place suction feet into the four designated holes for feet.

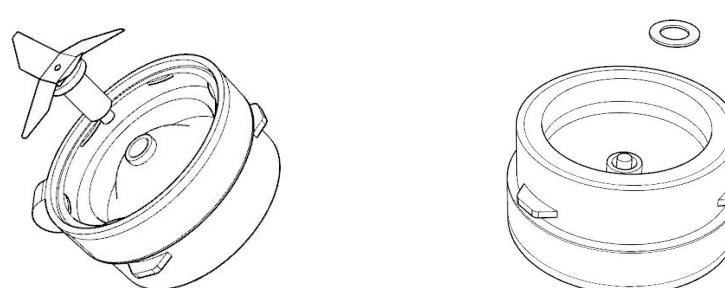


## 2# Making the Level 1 Jar Head Blade

- Place the blade seal (2) onto the blade rod (1). Next, position the brass bush (3) sourced from sourcing map on top of the seal.



- Pass the rod through the hole in the middle of the head piece (B1). Flip it upside down and slide the M5 washer (4) onto the rod.

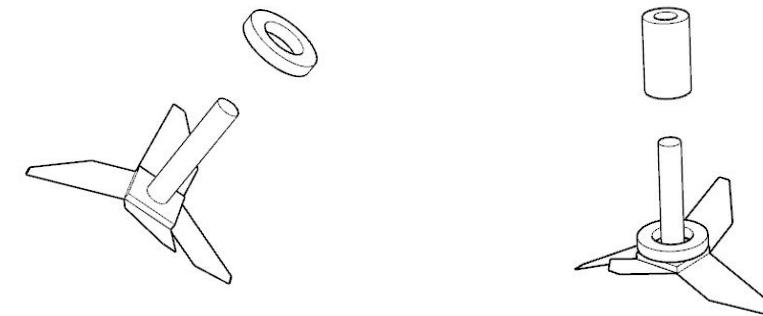


- Rotate the blade gear counterclockwise and insert it into the threaded blade head. Ensure the blade remains stable without any vertical movement. Add additional washers if necessary to secure it in place.

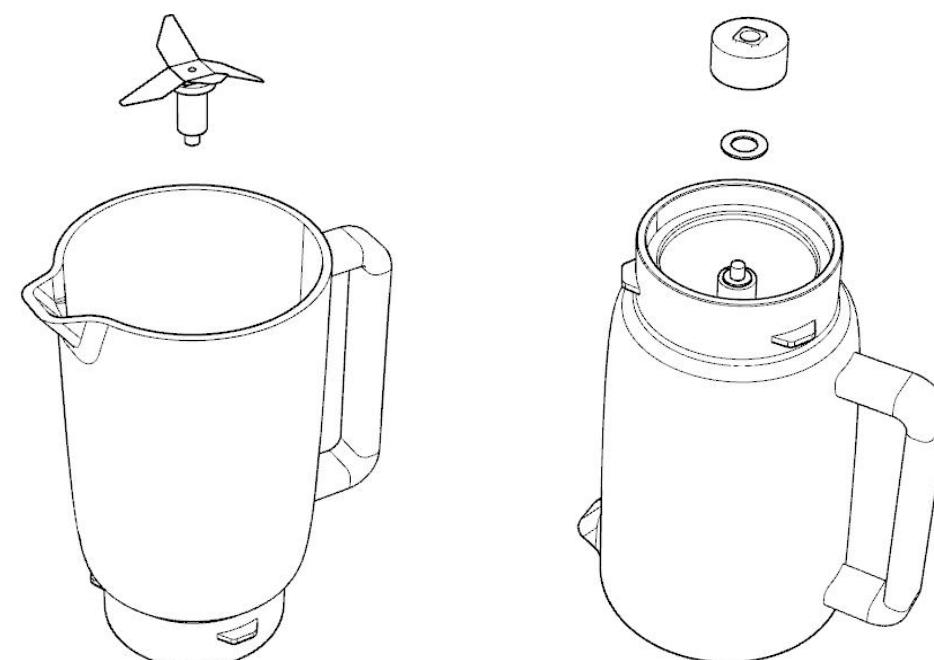


## 3# Making the Level 2 Pitcher

- Insert the blade seal (2) onto the blade rod (1). Then, place the brass bushing (3) sourced from sourcing map on top of the seal.

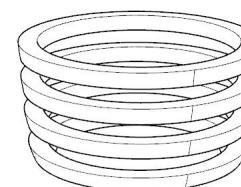
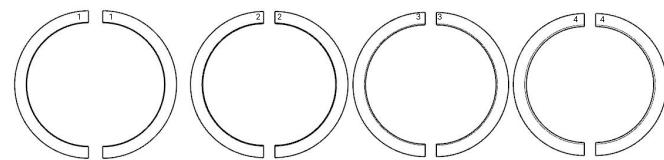


- Pass the rod through the hole in the middle of the head piece (C2). Flip the pitcher upside down and slide the M5 washer (4) onto the rod.
- Rotate the blade gear (5) counterclockwise and insert it into the threaded blade head. Ensure the blade stays stable without any vertical movement. Add additional washers if needed to securely fasten the blade.

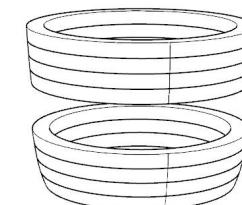
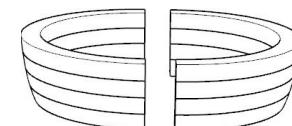
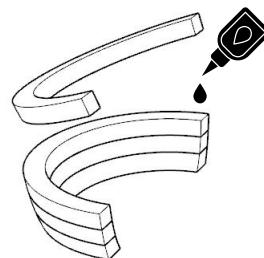


## 4# Making the Level 3 Ceramic Pitcher

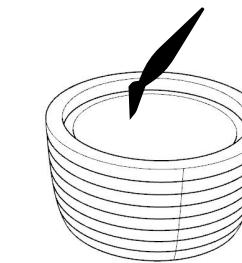
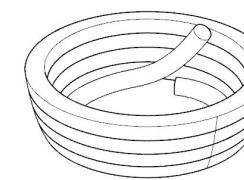
- Download the laser cut files and use them to laser cut a 4mm MDF board. Arrange the pieces according to the numbers provided.



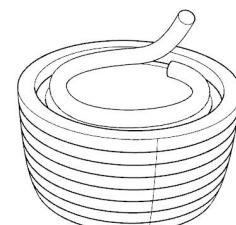
- Group the pieces in sets of four (1 to 4, 5 to 8, 9 to 12, etc.).
- Glue each group together using wood glue. You will end up with 10 groups. Arrange these groups in order, so you can easily add each layer as your coils are completed on the previous one.



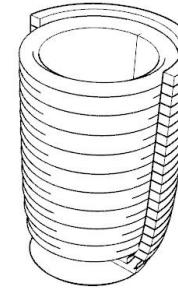
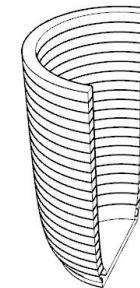
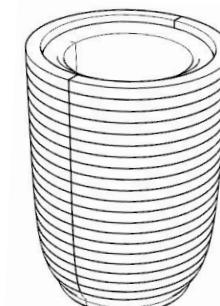
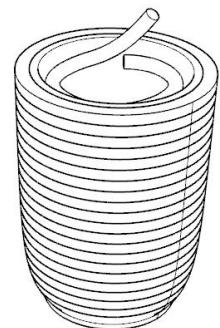
- Prepare coils that are 10 mm thick and 30 cm long, roughly the size of your little finger. Avoid letting the coils dry during the construction of the pitcher.
- Add coils in layers. After each layer blend the clay from inside.



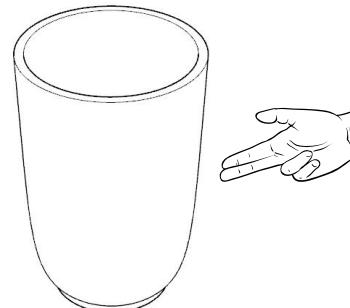
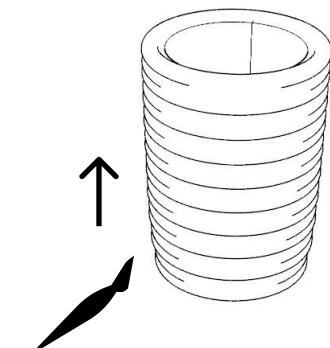
- When you reach the final 10 mm of your MDF guide block, add the next MDF guide and continue building the coils. Lay down the new coil and blend it seamlessly with the previous one.



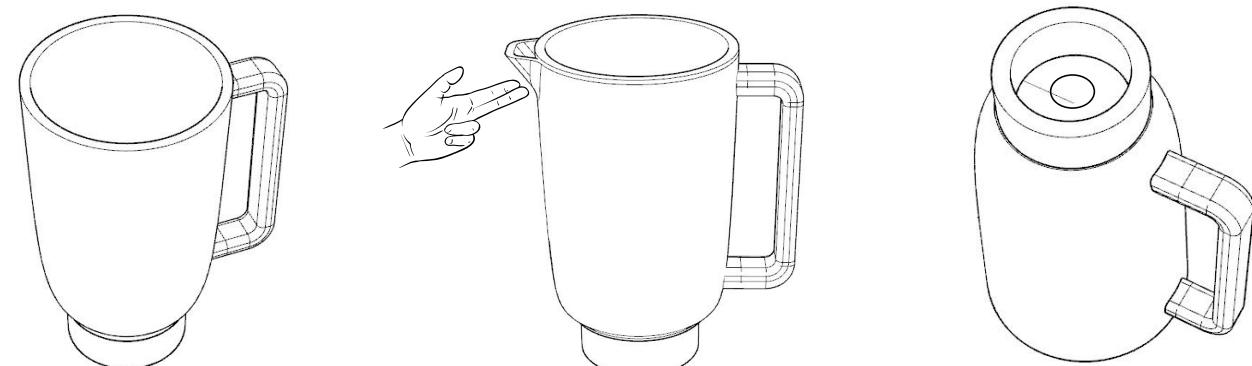
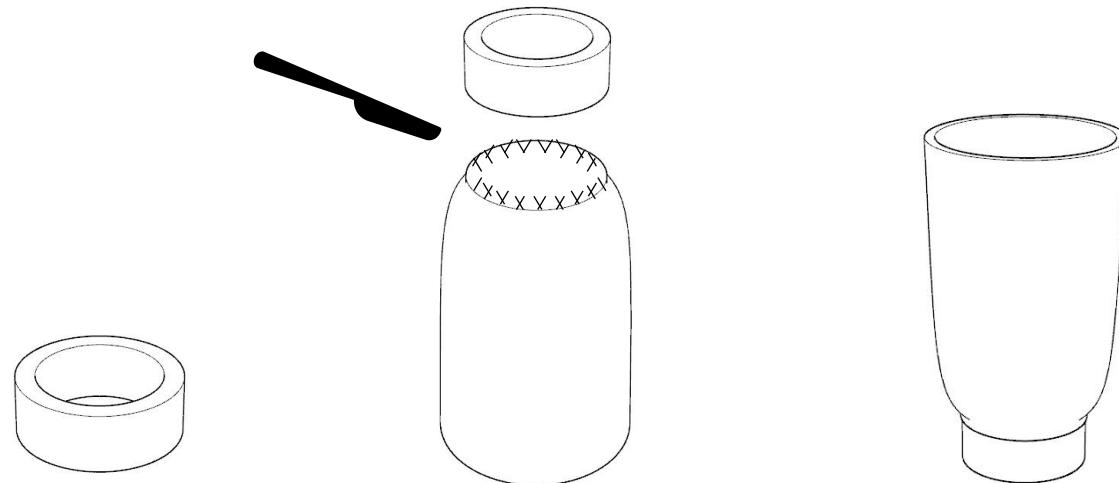
- After completing the last MDF guide, carefully separate the guides from the cut middle part.



- After separating your clay from the guide, blend the outer surface that remains in coil pattern, starting from the bottom layer and working upwards. Continue shaping and blending until you achieve a smooth surface.



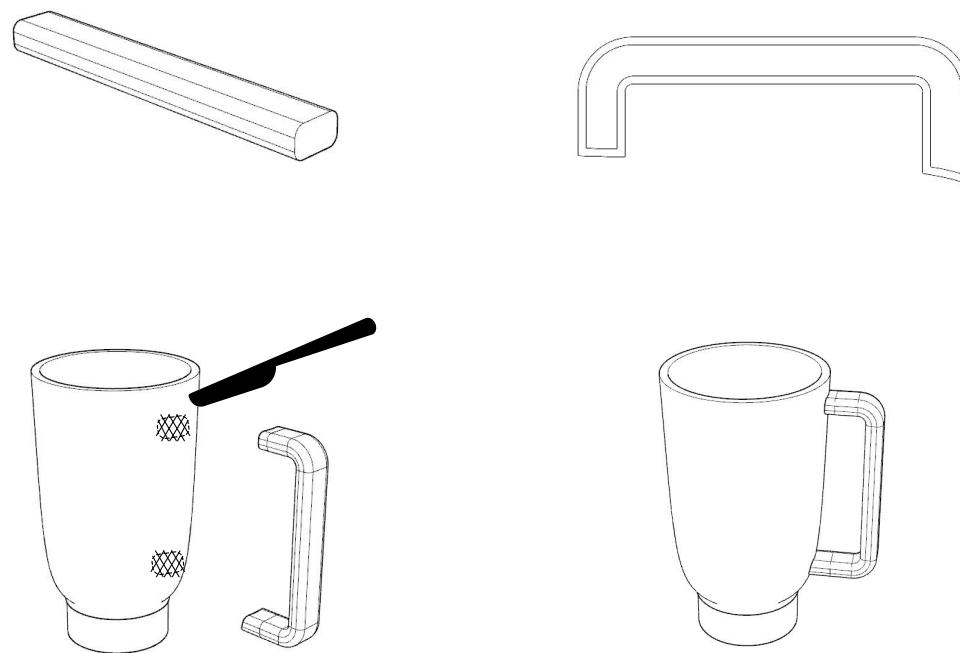
- Repeat the same process for the flat bottom piece.
- When the bottom piece is ready, carefully attach the jug to the bottom piece using the hatching and slip (liquid mixture of clay and water that acts as an adhesive for joining pieces of clay together).
- Lastly, shape the spout by hand from the top left corner, using your fingertips to form it.
- Open a hole at the end of the jug with a 14 mm diameter. (Earthenware clay has a shrinkage rate of 10%, so the hole will be approximately 12.6 mm after firing in the kiln.)



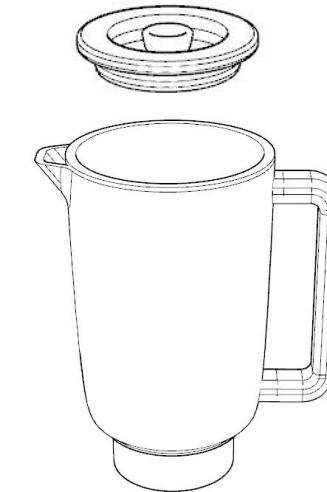
- Build a box with dimensions of 20 cm x 5 cm x 3 cm using the template guide.
- Mark the area for the handle on the ceramic pitcher. Hatch and apply slip to both ends of the box and the marked area on the pitcher.



- After letting the pieces dry for 5-7 days, bisque fire the pieces and the lid in the kiln at 1100-1120°C. Seek advice from an expert if you are unsure about the process.

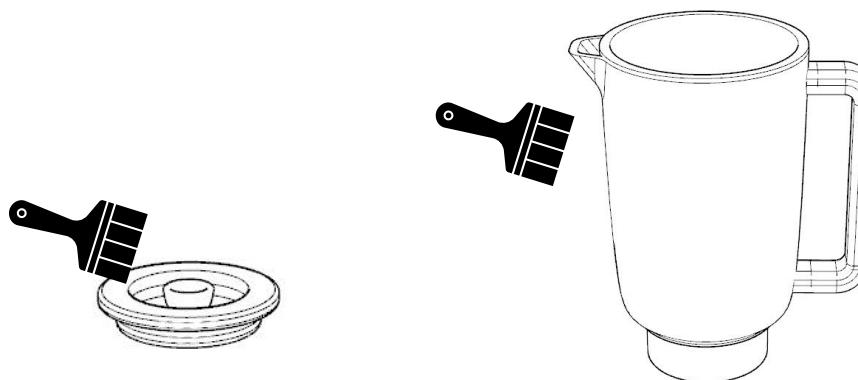


To fire your piece, find a local ceramic workshop that offers kiln firing services.



## # Assembly Instructions for the Level 3 Pitcher

- Cover the piece with an earthenware glaze, applying 3-4 layers.
- Allow it to dry for 2 days.



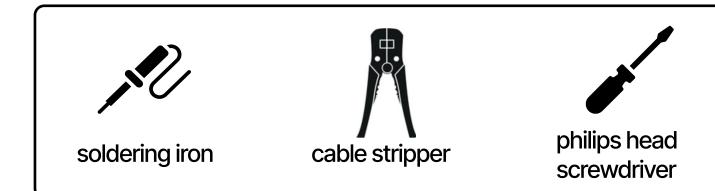
A transparent glaze is recommended, as many colored glazes may not be food safe.  
If you choose to use a colored glaze, ensure it is certified for food contact and is food safe.



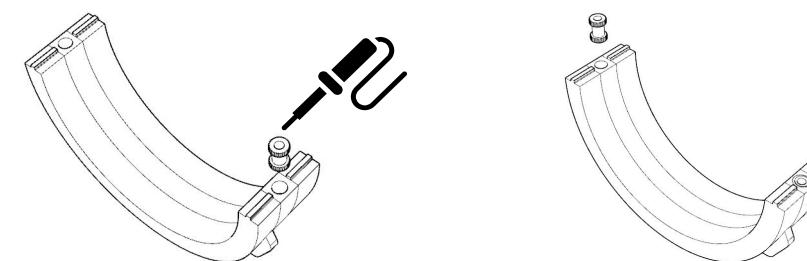
- Glaze fire the pieces and the lid in the kiln at 1100-1120°C.

To fire your piece, find a local ceramic workshop that offers kiln firing services.

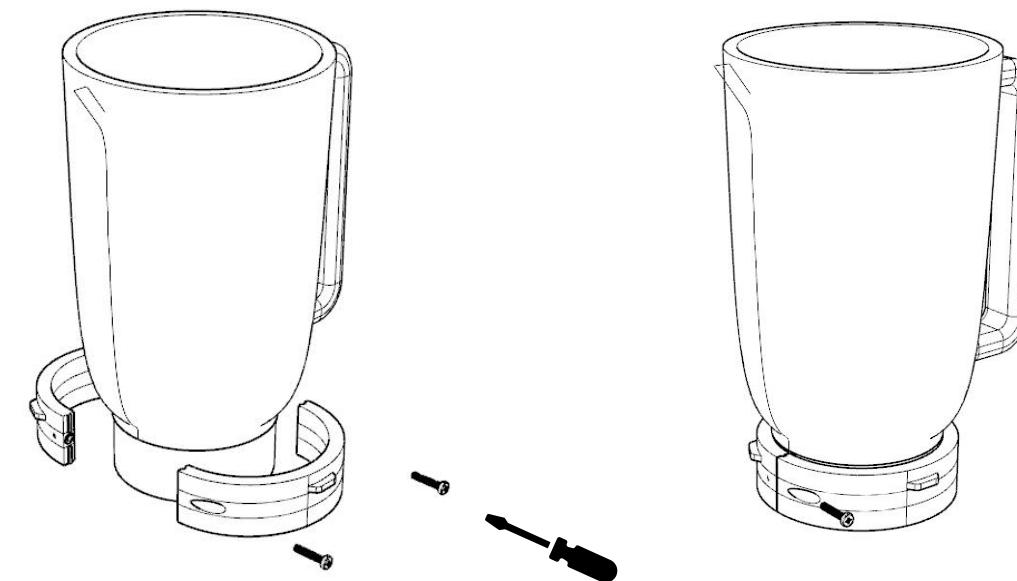
Tools needed:



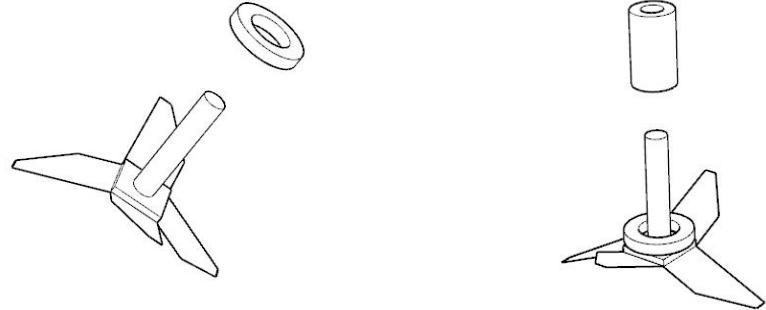
- Use soldering iron to insert two M3, h = 6mm Ø = 5mm, heat insert nuts into D3 and D4.



- Thread the O-ring with a diameter of 75 mm under the jug.
- Position the ceramic pitcher (D2) in the center and affix the D3 and D4 pieces on each side. Use a Phillips head screwdriver to secure them.



- Place blade seal (2) into the blade rod (1). Then place brass bush- sourcing map (3) on top of the seal.



- Pass the rod through the hole in the middle of the head piece (D2). Flip the pitcher upside down and slide the M5 washer (4) onto the rod.
- Rotate the blade gear (5) counter clockwise and insert it into the threaded blade head. Ensure the blade remains stable without moving up or down. Add more washers if needed until it remains secure.

