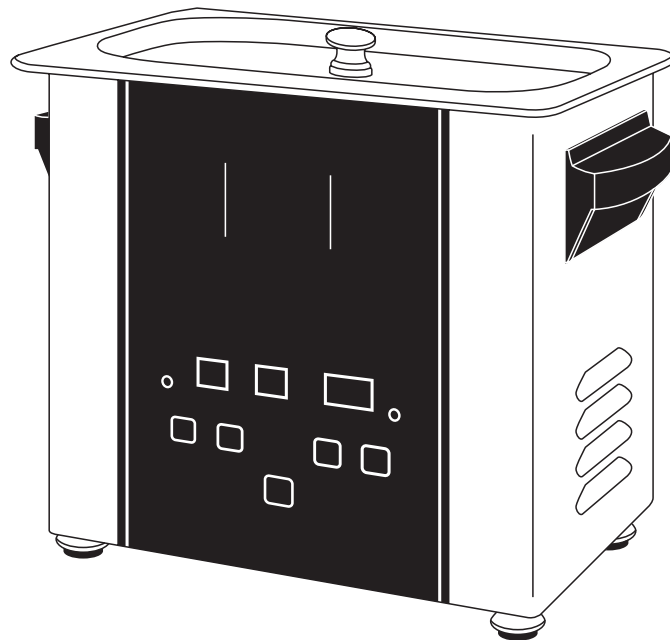




Ultrasonic support removal tank

User guide and safety manual



See inside for use and safety information.

The Ultrasonic support removal tank automatically removes PLA support material from a printed ABS model.

The tank can use two different methods to remove or weaken the material:

- 1 Hot water for 48 hours will weaken any PLA material to a point where it can be lightly scraped away.
- 2 Ultra sonic vibration with a solution of caustic soda for 3 hours will dissolve any PLA material.

The Ultrasonic support removal tank package (Figure 1) contains:

- 1 x support removal tank
- 1 x power lead
- 1 x safety goggles
- 1 x pair of rubber safety gloves
- 1 x pairs of tongs



General safety instructions



PLEASE READ THE FOLLOWING WARNINGS CAREFULLY.

Maintenance safety:

- Do not attempt to remove any screws or panels. There are no user serviceable parts inside.
- Do not operate this unit if the cord or plug is damaged.
- Only use the power lead supplied with the product. Replace if it becomes damaged in any way.
- To avoid electric shock never touch the cord or socket with wet hands.

Electrical requirements safety:

- Never operate without, or remove, the safety ground (earth) from the A.C. power cord / mains lead.
- Keep the unit unplugged before filling.
- Always unplug the unit immediately after use and before emptying.
- Make sure the support removal tank is correct for your local supply voltage.

Operation environment:

- Do not operate the unit next to heat sources such as radiators.
- Operate on a dry level surface.
- To avoid electric shock do not immerse the unit into water or other liquid. The unit should not be exposed to dripping or splashing and no objects filled with liquids should be placed on top of it. The unit should not be operated or stored near rain or moisture.

Harmful actions:

- Do not use boiling water as damage to the unit may occur.
- Always fill the unit with 2 liters of water, irrespective of model size.
- Do not allow objects or liquid to enter the unit anywhere except the tank.
- The unit should never be left unattended when plugged in.
- Never operate the unit without water in the tank – damage may occur.

Different methods for removing support material

Hot water only

Leaving the model submersed in hot water (80 °C) for 48 hours, without ultra-sonic agitation, will rapidly accelerate the degradation of the PLA support material to a point where it will easily crumble when pulled away.



THIS PROCESS USES HOT WATER (APPROXIMATELY 80 °C). ENSURE ALL PERSONAL PROTECTIVE EQUIPMENT (PPE) IS WORN. NEVER OPERATE THE UNIT WITHOUT WATER IN THE CLEANING TANK – DAMAGE MAY OCCUR. NEVER USE BOILING WATER – DAMAGE MAY OCCUR.

Advantages: Use of corrosive chemicals is avoided.

Disadvantages: Support material still requires slight physical force after soaking to be crumbled away. Support material in hidden cavities may still remain after soaking if the user is unable to reach them. Process takes a relatively long time.

- Position the unit on a stable and flat working surface. The tank must not be knocked or moved during operation due to the risk of splashing water onto electrical components.
- Before connecting the power lead, add water to the tank. Pour water into the tank to the point illustrated in Figure 2. Always fill to this point, irrespective of the model size. Any less may damage the tank while it is in operation.
- Load the models into the tank.
- Place the items to be cleaned into the tank.
- Close the lid.
- Connect the tank to the power supply.
- Before connecting the power lead. Check the specification label for the correct operating requirements (located on the rear of the unit).
- Connect the power cable on the rear of the unit and ensure the wall supply is switched ON.
- Press the ON/OFF button on the front panel to turn the tank ON. You are now ready to set the temperature.
- The actual temperature of the water in the tank is displayed in the 'ACTUAL TEMPERATURE' window. The cleaner can heat the water to a desired temperature by adjusting the 'HEATER TEMPERATURE'. Press the button to increase, or the button to decrease the required temperature. During heating the RED 'HEATING' led will illuminate. For best results set the temperature to 80 °C. When the set heating temperature is reached the 'HEATING' led will turn off and you are now ready to start timing.
- Do not use the timer on the tank for the hot-water method – it will only go as far as 180 minutes and is only intended for the ultra-sonic operation used with the caustic soda method. Set a separate alarm for 48 hours later. After the first 24 hours, it may be worth checking your model every 6 hours (following the model removal instructions below). 48 hours is a guide only as the rate of degradation is geometry dependent, and it may be that your support material is ready for material removal earlier than 48 hours later.
- Remove the model from the tank.



Figure 2



THE WATER WILL BE VERY HOT, ENOUGH TO BE A RISK OF BURNING. THEREFORE USE THE SUPPLIED PPE: TONGS, GOGGLES AND GLOVES MUST BE USED.

- After removing the model, wash the model in a sink with cold water for 20 seconds.
- Remember to turn the tank off after use.



EVEN OUTSIDE THE TANK, HOT WATER IN ANY MODEL VOIDS MAY SPILL, AND THERE IS THEREFORE A RISK OF BURNING. THE MODEL MUST BE HANDLED WITH SUPPLIED PPE: TONGS, GOGGLES AND GLOVES, UNTIL THE MODEL HAS BEEN WASHED UNDER COLD WATER IN A SINK.

- After the model has been washed, the PLA support material will crumble easily. Use a blunt knife to scrape the support away from the model. Further rinsing may help flush support material fragments from the model.

Caustic soda

Leaving the model submerged in water saturated with caustic soda for 3 hours, with ultra-sonic agitation, will dissolve the PLA support material completely.



CAUSTIC SODA CAN BURN IF HANDLED IMPROPERLY. NEVER HANDLE CAUSTIC SODA WITHOUT USING ALL OF THE SUPPLIED PERSONAL PROTECTIVE EQUIPMENT (PPE): GLOVES, GOGGLES AND TONGS. IF CAUSTIC SODA TOUCHES THE SKIN, WASH IMMEDIATELY. IF CAUSTIC SODA TOUCHES THE EYES, USE EYE WASH TREATMENT IMMEDIATELY. NEVER OPERATE THE UNIT WITHOUT WATER IN THE CLEANING TANK – DAMAGE MAY OCCUR. NEVER USE BOILING WATER – DAMAGE MAY OCCUR.

Advantages: Fast removal. Support material in hidden cavities will be dissolved without the need for physical force, assuming the solution can reach the cavity.

Disadvantages: Use of caustic soda requires health and safety procedures.

- Position the unit on a stable and flat working surface. The tank must not be knocked during operation due to the safety risk of splashing water onto electrical components.
- Before connecting the power lead add water to the tank.
- Fill the tank with only cold water. Adding the caustic soda will cause an exothermic reaction which will elevate the temperature of the solution.
- Pour water into the tank to the point illustrated in Figure 2. Always fill to this point, irrespective of the model size. Any less may damage the tank while it is in operation.
- Add caustic soda to the tank.



CAUSTIC SODA IS A HARMFUL SUBSTANCE – IF IT TOUCHES THE SKIN OR THE EYES AND CAN CAUSE PERMANENT DAMAGE. NEVER HANDLE CAUSTIC SODA WITHOUT USING THE SUPPLIED GLOVES AND EYE PROTECTION. USE OF PERSONAL PROTECTIVE EQUIPMENT IS ESSENTIAL. AFTER USE, ENSURE THAT THE AREA IS CLEANED DOWN IMMEDIATELY, AND CAUSTIC SODA LOCKED AWAY TO PREVENT MISUSE. DO NOT USE THE ULTRA-SONIC FEATURE WHILE STIRRING IN THE CAUSTIC SODA. THIS WILL ENCOURAGE THE SOLUTION TO VAPORISE. ENSURE THAT THE AREA IS WELL VENTILATED, AND THAT YOU DO NOT INHALE THE VAPOR DIRECTLY FROM THE TANK.

- Preparing a set of scales and measuring bowl to measure out a weight of caustic soda.
- Before opening the caustic soda container, wear rubber gloves and goggles. Make sure no skin is exposed. Measure out 200 g of caustic soda. (Figure 3)
- Pour the caustic soda into the tank slowly (approximately 40 g at a time). * Stir thoroughly after each pour.* The caustic soda will tend to stick to the bottom of the tank. Stirring is essential to make sure that the caustic soda granules do not 'lump up' at the bottom of the tank.
- Wash all apparatus thoroughly after transfer is complete to ensure that no caustic soda residue remains.
- With the tongs, slowly lower the model into the tank (Figure 4).

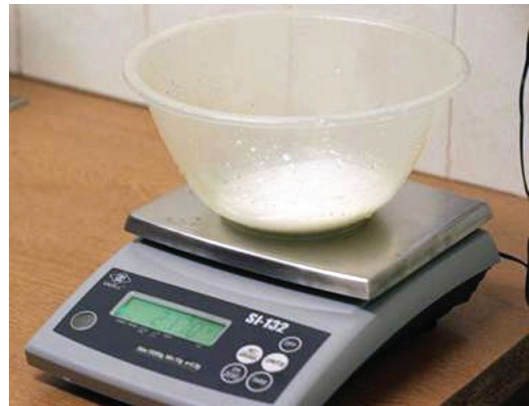


Figure 3



DURING DEPOSITION OF THE MODEL INTO THE SOLUTION, THERE IS A RISK OF SPLASHING SOLUTION OUTSIDE OF THE TANK AND ONTO YOURSELF. ENSURE ALL SUPPLIED PERSONAL PROTECTIVE EQUIPMENT (PPE) IS WORN/ USED: GLOVES, GOGGLES AND TONGS.

- Ensure that the level of the water covers the model completely.
- Close the lid.
- Connect the tank to the power supply.

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- Before connecting the power lead. Check the specification label for the correct operating requirements (located on the rear of the unit).
- Connect the power cable on the rear of the unit and ensure the wall supply is switched ON.
- Press the ON/OFF button on the front panel to turn the tank ON. You are now ready to set the timer and temperature.
- The actual temperature of the water in the tank is displayed in the 'ACTUAL TEMPERATURE' window. The cleaner can heat the water to a desired temperature by adjusting the 'HEATER TEMPERATURE'.
- Press the +5 button to increase, or the -5 button to decrease the required temperature. During heating the RED 'HEATING' led will illuminate.
- For best results set the temperature to 60 °C.



Figure 4



DO NOT SET THE TEMPERATURE ABOVE 60 °C AS THE REACTION BETWEEN THE CAUSTIC SODA AND THE WATER IS EXOTHERMIC, AND WILL CONTINUE TO ELEVATE THE TEMPERATURE: ACTUAL TEMPERATURE SHOULD NOT EXCEED 80°C.

- Start the ultra-sonic process.
- Starting the timer will activate the ultra-sonic process. When the power is connected the timer displays 00. Pressing the +5 button or the -5 button increases or decreases the desired treatment time.
- Once the timer is set, the ultra-sonic cleaning process starts immediately, so the timer should only be set after the required operating temperature has been reached. The timer display will count down the remaining time in minutes. Once the timer reaches 00 the ultrasonic process will stop. Timer adjustment can be made while the unit is in operation.
- The unit will enter 'standby' mode 60 seconds after the cleaning cycle has finished. To re-start the unit, press the ON/OFF button.
- Set the timer for 180 minutes.
- Remove the model from the tank.
- After the support material has been removed, remove the model from the tank.



USE THE EYE AND HAND PROTECTION LISTED ABOVE: DURING EXTRACTION OF THE MODEL FROM THE TANK, THERE IS A RISK OF SPLASHING SOLUTION OUTSIDE OF THE TANK AND ONTO YOURSELF. EVEN OUTSIDE THE TANK, CAUSTIC SOLUTION MAY REMAIN IN ANY MODEL VOIDS AND THEREFORE THERE IS STILL A RISK OF BURNING. THEREFORE THE MODEL MUST BE HANDLED WITH SUPPLIED PPE: TONGS, GOGGLES AND GLOVES, UNTIL THE MODEL HAS BEEN RINSED.

- After removing the model, wash the model in a sink with cold water for 20 seconds to flush the model and inspect it. If support material remains, repeat the removal process for an extra 60 minutes. If the model is clean, proceed to the next step.
- Over time, any caustic solution residue left on the model may stain it. A thorough rinse clean is needed to prevent this from happening.
- Empty the solution from the tank following the stages in the next section. Refill the tank with cold water, as per the procedure above.
- Apply an ultra-sonic treatment for another 30 minutes in the clean water. This will ensure that no caustic solution remains on the model.

Emptying the tank

It is safe to dispose of the solution down the drain (it is drain cleaner) (Figure 5).

The tank features useful 'pour grooves' in the top of the tank to make removal of waste liquid simple and safe. Always ensure the unit is disconnected from the mains and the mains lead is removed from the unit when discarding liquids.



WHEN DISPOSING OF THE CAUSTIC SOLUTION, OR HOT WATER, ALWAYS ENSURE THAT PPE IS WORN (THE SUPPLIED GLOVES AND GOGGLES).



Figure 5

Storage

When finished using the tank, ensure it is in 'standby' mode by pressing the ON/OFF button and checking the displays turn off. Disconnect the unit from the mains supply and remove the power cable.

The unit should be stored in a cool dry place, away from any heat sources (radiators etc) and sources of moisture (bathrooms etc). Ideally, the unit should be stored in its original packing for maximum safety.

Specifications

- Minimum volume: 1.8 liters
- Maximum volume (to rim): 2.6 liters
- Tank dimension: 265 x 164 x 100mm
- Tank inner dimension: 220 x 120 x 80mm
- Ultrasonic Power: 100 watts
- Operating frequency: 40 kHz
- Unit weight: 3.4 kg

Supply

- Caustic soda is also known as Lye.
- Caustic soda can be bought from all good DIY stores. It is typically used to clean drains.
- Cubify does not supply Caustic soda.