

CNSI Innovation Workshop SCA-1200HT Solution Change Safe Operational Procedure

Last Updated: Bassari (10/4/2021)

This SOP is compiled from the Stratasys FDM Best Practice handbook, under FDM Support Removal. This manual can be found in drawer F1 Stratasys F270 tools. The SOP also draws content from the SCA-1200HT manual, found on the Innovation Workshop wiki under the relevant tool page.

Location

The support removal apparatus is located in Elings 2442 in front of the fume hood.

Overview

The SCA-1200HT circulates a support removal concentrate (Ecoworks packets or WaterWorks concentrate, Stratasys) at elevated temperatures to eliminate the PVA support from parts that are printed using the F270 FDM 3D printer. The cleaning solution must be periodically replaced; this document covers the safe procedure to accomplish this.

Safety Considerations

- 1) Wear a **lab coat** (found in Elings 2442), **face shield**, and **gloves** (found next to the machine) before any operation involving the SCA-1200HT.
- 2) Ensure the machine is off, the temperature is below 30 degrees, and the device is unplugged before any work.
- 3) The solution is basic. Be careful to not spill the solution and be cautious of splashes when manipulating the fluid.
- 4) Water spills are a big problem in Elings hall, so **any operation involving the draining or addition of liquids must be closely monitored** to prevent overflow.

Operation

A) Identifying the need for solution change

The recommended replacement cycle for the solution is after removing 410cc of support (~9kg) per 11-gallon tank. In practical terms, the following observations indicate the need to change the solution:

- i) The tank is cloudy, and white parts change color after cleaning.
- ii) Parts display residue, stick together, or have malfunctioning moving parts.
- iii) Support material is not removed after the recommended wash routine (8 hours, 70c).
- iv) pH level, measured with a test strip, is below 11.5.

B) Drain the tank of the old solution

The solution has been verified by environmental health and safety for drainage through the sink located next to the device.

- i) Ensure that you are equipped with the appropriate gear (gloves, lab coat, face shield).
- ii) Turn the power off and unplug the machine from the wall plug - both the power button and the power cord are visible in the lower right section of the tank.
- iii) Take the tube attached to the outlet valve (visible at the bottom of the device) and place it in the sink.
- iv) Rotate the valve open and hold it open until the liquid is entirely drained.
- v) Close the valve.

D) Clean the tank

- i) Remove large chunks of material from the tank.
- ii) Take out the strainer and clean it using a brush and warm water.
Note: Never remove the strainer when there is liquid in the tank - this will allow debris to get into the outlet tube.
- iii) If there is significant residue on the body, use mild soap and water with a piece of cloth or sponge to wipe the residue away.

C) Refill the tank with solution

- i) Open the tank lid.
- ii) Place the hose attached to the Deionized water tap inside the tank.
- iii) Turn the water open and fill the tank up to the minimum fill line, which should be visible on the rear support bracket. There is a maximum fluid line that should not be exceeded.
- iv) Depending on the used concentrate:
 - If using Ecoworks (Located in drawer F6): add 6 packets of A (3) and B (3) components to the water.
Clarification: package refers to a foil bag; each package contains a few pouches of powder that should be dropped into the water.
 - If using WaterWorks (Located on the shelf next to the printer): add ~1000 g or a full bottle to the water. Be sure to seal the bottle afterward.
- v) Turn the heat off and start the device, allowing the pump to circulate the solution for an hour. After this, the machine is ready for operation.

SCA-1200HT Quick Review

Safety Considerations

- 1) Wear a lab coat (found in Elings 2442), face shield, and gloves (found next to the machine) before any operation involving the SCA-1200HT.
- 2) Unplug the bath before any work.
- 3) The solution is basic. Be careful to not spill the solution and be cautious of splashes when manipulating the fluid.
- 4) Water spills are a big problem in Elings hall, so any operation involving the draining or addition of liquids must be closely monitored to prevent overflow.

Safe Operating Procedures Review

A) Identifying the need for solution change by taking note of failure to effectively remove support and looking for a murky solution.

B) Drain the tank of the old solution using the hose that is attached to the outlet valve of the tank. The solution should be directly drained into the sink.

C) Refill the tank with the solution with DI water from the tap and add 6 packs of Ecoworks or a full bottle of WaterWorks to the water. Let the pump circulate for one hour before resuming operations.