



Application Note



Overview

Water-Soluble Support SUP707 offers the following advantages:

- An almost fully automated Support removal process.
- Easy removal of Support material from parts with fine details and small cavities (see Figures 1 to 3).

This document describes recommendations and tips for achieving best results when using SUP707.

- Printing Modes and Printing Materials
- Support Material Replacement
- Printer Maintenance
- Preparing Trays for Printing
- Model Design Considerations
- Removing Printed Parts from the Build Tray
- Support Removal Process
- Alternative Support Removal Process

Recommendations and Tips

A. Printing Modes and Printing Materials

The following printing modes and printing materials can be used with SUP707:

Printing Mode	Printing Materials
High Speed	VeroWhite
High Quality	VeroWhite, VeroBlue, VeroGray, VeroClear

Other printing modes and printing materials are not supported.

B. Support Material Replacement

To switch between SUP707 and SUP705, run the Material Replacement Wizard and select the *Economy* cycle for Support cartridges.

C. Printer Maintenance

For best results when using SUP707, the printer should be in good working condition.

- Run the Head Calibration utility and calibrate the print heads according to the recommended schedule.
- Make sure that the UV lamps are calibrated.
- Make sure that the roller waste collector is clean and that the roller scraper is in good condition.

D. Preparing Trays for Printing

- In Objet Studio, choose SUP707 from the Tray Settings pull-down menu (see Figure 4).



Figure 1: Model with fine detail

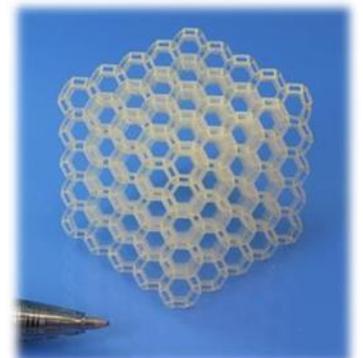


Figure 2: Model with small cavities



Figure 3: Model with fine detail and small cavities.



Figure 4: Tray Settings screen in Objet Studio

- Parts without thin walls: For best quality and shortest printing time, place the object's smallest dimension along the Z axis with the longest dimension along the X-Y axis (see Figure 5).
- Parts with thin walls: If possible, orient the part so that thin walls are parallel to the X-Y axis (see Figure 6).
- When printing models with a matte surface finish, the top or bottom layer of the model (X-Y axis) will have a surface finish similar to a glossy surface finish (see Figure 7).

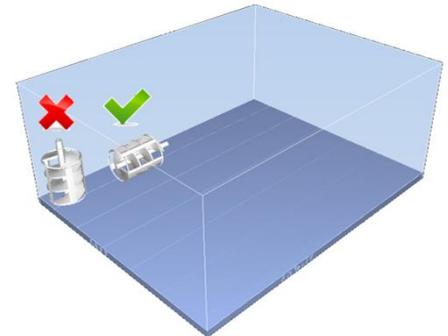


Figure 5: Model orientation (no thin walls)

E. Model Design Considerations

Certain design considerations may help to completely remove SUP707. In general, the design should allow water to come into contact with, the Support material.

- If possible, design models with more than one open end to allow water flow through them. This allows for easier cleaning.
- Cavities or small closed features, such as blind holes, should have a diameter of at least 4 millimeters. This allows for water to flow through the printed model, resulting in thorough support removal.



Model designed for water flow



SUP707 cannot easily be removed

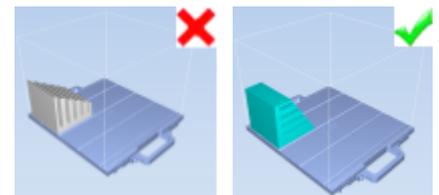


Figure 6: Model orientation (thin walls)

F. Removing Printed Parts from the Build Tray

Remove the printed part from the build tray after printing. Parts that are left on the build tray may release small amounts of liquid, resulting in a puddle on the build tray.

For delicate parts, Stratasys recommends to begin the cleaning process soon after removing the part from the printer.



Objet Studio enables you to schedule your print jobs so that printing will finish at a convenient time.

G. Support Removal Process

There are four steps to removing SUP707 from printed parts:

1. Washing parts with water in a cleaning device.
2. Soaking parts in a caustic soda solution.
3. Dipping parts in a glycerol solution.
4. Drying the parts.

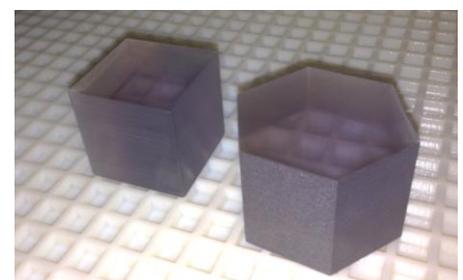


Figure 7: Models printed with a matte finish



Removing Support material by rubbing it or scratching it off might cause the Model material to discolor. This is more noticeable in clear parts (See Figure 10).



Figure 10: SUP707 on the top part was rubbed off; the bottom part was left to dry.

1. Cleaning Parts in the Cleaning Station

- Use tap water in the cleaning station. Replace the water when the concentration of SUP707 reaches 2%. The cleaning station holds 20 liters of water. Therefore, up to 400 grams of SUP707 can be dissolved before it is necessary to replace the water.

Example: If a model with 100 grams of SUP707 is cleaned in the cleaning station, it will dilute the water with .05% of SUP707. In this case, the water can continue to be used until an additional 300 grams of SUP707 is dissolved in the tank.

Dispose of waste-water according to local regulations. Contact Stratasys or your Stratasys Reseller for a copy of the SUP707 Waste Profile Datasheet.

- The estimated weight of SUP707 used is indicated in the *Support Consumption* column in Objet Studio Job Manager (see Figure 11).

Job Name	Status	Owner	Build time	Models Consumption	Support Consumption
Tray1.obj	Building [0...	Training	01:23	26 g	30 g

Figure 11: Objet Studio Job Manager Support Consumption

- The concentration of the dissolved Support material in the water can also be roughly assessed by visually inspecting the water. The clarity of the water is significantly reduced as it becomes more and more contaminated with SUP707.

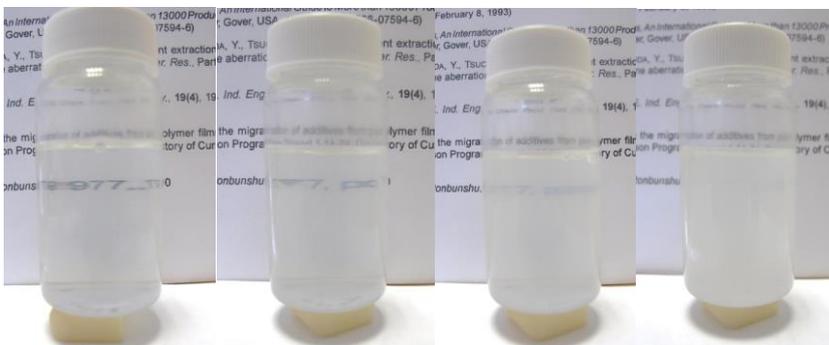


Figure 12: Reduction in water clarity as more SUP707 dissolves into it

- Reduce the amount of water required for the cleaning process by gently removing chunks of Support material by hand from the part before placing it in the cleaning station.
- Average cleaning time is 4-8 hours. Cleaning time might be up to 12 hours, depending on the part's geometry, size, number of parts in the cleaning station, amount of Support, and the water saturation level.



Using water which contains 2% or more of dissolved SUP707 increases the cleaning time.

2. Soaking Parts in a Caustic Soda Solution

- Remove the parts from the cleaning station. Place them in a 1-percent caustic soda solution.



Caution:

Never pour water into a caustic soda solution. Mixing it with water generates heat that could ignite other materials. Always add caustic soda to water. Always take adequate safety precautions; always use nitrile gloves when handling caustic soda and models soaked in it.

- Soak the parts in the caustic soda solution until you observe that the outer layer of the Support material has dissolved. On average, it is sufficient to soak the parts for five hours. Additional soaking time may be required, depending on the geometry of the part.
- Rinse the printed parts in fresh water.

3. Dipping Parts in a Glycerol Solution

To achieve best surface quality and improved mechanical properties, dip the printed parts in a 15-percent glycerol solution.

- Do not wash or wipe the parts after immersing in glycerol.
- To avoid stains on the model, while drying it, minimize contact between the model and the drying surface (see Figure 13).



Each time you immerse a wet model into the glycerol solution, the solution becomes slightly diluted. Replace the glycerol solution every 1-2 weeks, depending on frequency of use.

4. Drying the Parts

After the wet cleaning process (cleaning station, caustic soda solution, and glycerol solution) the part surface might become slippery (see Figure 14).

- Allow the part to dry until it is no longer slippery.

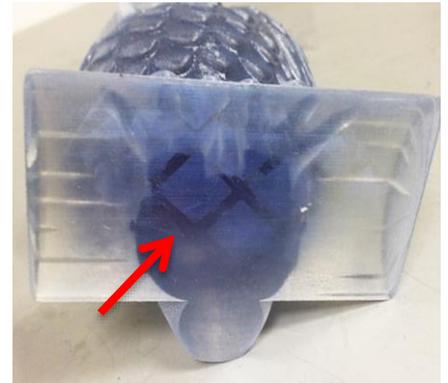


Figure 13: Stain on the model caused by leaving it on a patterned surface while drying.



Figure 14: Part surface might be slippery after the wet cleaning process.

H. Alternative Support Removal Process

It is possible to remove SUP707 manually using a standard WaterJet, but make sure to be careful when handling models with delicate features.

For best results, after cleaning the model in a WaterJet, immerse the model in a caustic soda solution and then in a glycerol solution (see above).

Disclaimer

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