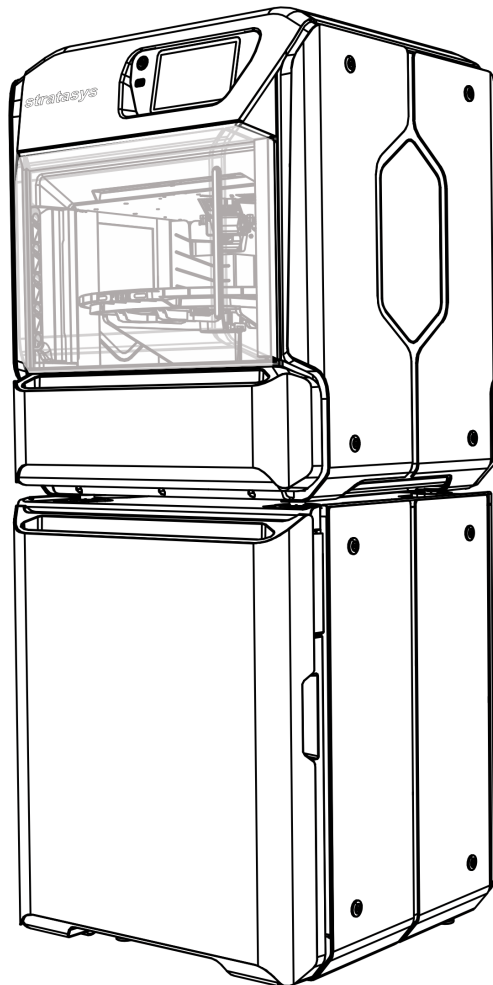




# stratasys®

Stratasys J5 Series  
3D Printing System



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DOC-09270 Revision J

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The equipment referred to in this guide has been tested and found to comply with the limits for a Class A device pursuant to part 15 of the FCC rules. These limits provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. Stratasys 3D printing systems generate, use and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

The 3D printer referred to in this guide contains a transmitter module, FCC ID YH6-DUPCAB.

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7,604,768

7,658,976

7,725,209

7,958,841

7,991,498

7,996,101

8,219,234

8,278,866

8,781,615

8,865,047

9,020,627

9,031,680

9,227,365

9,662,836

9,688,021

9,738,033

10,016,944

10,099,406

10,363,729

10,611,136

10,632,679

10,828,905

10,894,399

10,940,616

10,994,475

11,065,818

11,084,205

D966,355

D940,212

D939,900

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January 2023





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# 1

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## Using This Guide

This user guide provides instructions for installing, operating and maintaining Stratasys J5 Series 3D printing systems. It explains how to use features, and provides practical examples to guide you as you use the system.

**Important:** Read the entire Safety chapter before using the system.

The text and figures in this guide are based on the J5 Series 3D printer, software version 1.6.

This guide assumes that—

- all the hardware, software, and network components of your system are installed, configured, and operating correctly.
- the operator has a working knowledge of the Windows® PC platform.

Visit the [Stratasys Support Center](#) to download the latest revision of this document. This document is also available on the Support Center in other languages.

If you have any questions or comments about the way information is presented in this guide, or if you have any suggestions for future editions, please send a message to [c-support@stratasys.com](mailto:c-support@stratasys.com).

## Terms Used in This Guide

<b>Build tray</b>	<i>In the print preparation application:</i> The surface displayed on the screen that represents the actual build tray in the printer. <i>In the printer:</i> The substrate for 3D printing.
<b>Cleaning fluid</b>	Cleanser for flushing material feed tubes and the printing block, used to completely remove model and support material from the system before loading another type of material in the printer and before long-term shutdown. The cleaning fluid is supplied in material cartridges.
<b>Client/user workstation</b>	The workstation on which software is installed for preparing build trays for production on PolyJet printers. (There is no limit to the number of client workstations.)
<b>GrabCAD Print</b>	A software application for preparing print jobs on a variety of 3D printers, including J5 Series printers.
<b>Mixed part</b>	3D prints that are produced using more than one model material.
<b>Mixed tray</b>	A build tray containing 3D prints, each designed to be printed using a different model material.
<b>Model material</b>	Material used for building the 3D prints.
<b>Printer computer</b>	The computer inside the J5 Series printer that operates it.
<b>Printer interface</b>	The GUI (graphical user interface) used for controlling J5 Series printers.
<b>Printer software, printer-control application</b>	Software running on the computer in the J5 Series printer, controlling all printer operations.
<b>Resin</b>	The base substance from which photopolymer printing materials are made for use in Stratasys PolyJet printers.
<b>STL</b>	A file used for printing 3D models.
<b>Support material</b>	Material used for supporting the structure of models during production.

## Revision History



Translations of this guide are updated periodically. If you are consuming a translated version, please check the English version for the latest revision and list of updates.

The following table lists the main changes in each revision of this document.

Revision	Release Date	Description
Rev. A	January 2021	<ul style="list-style-type: none"> <li>Updated user guide name to J5 Series</li> <li>J5 DentaJet trademark was added</li> </ul>
Rev. B	March 2021	<i>Optimizing the Print Heads</i> , a procedure for troubleshooting a scale connectivity error was added.
Rev. C	April 2021	<ul style="list-style-type: none"> <li><i>Calibrating Print Head Accuracy</i>, an instruction to clean the scanner platen after scanning was added.</li> <li><i>Source Files</i>, slicing resolution was added.</li> <li>J5 MediJet trademark was added.</li> </ul>
Rev. D	September 2021	<ul style="list-style-type: none"> <li><i>Loading Model and Support Cartridges</i>, instructions for using the printing modes and how to disable the empty cartridge alarm were added. A note was added about repeated piercing of the cartridge.</li> <li><i>Changing Printing Materials</i>, instructions for using the printing modes were added.</li> <li><i>Locking the Build Tray</i> was moved to the Producing 3D prints section.</li> <li>Routine maintenance for the wiper and the roller waste collector changed to every 4 months instead of every 3 months.</li> </ul>
Rev. E	February 2022	<i>Removing the Support Material</i> , information was added regarding SUP710, SUP711, and WSS150.

Revision	Release Date	Description
Rev. F	June 2022	<ul style="list-style-type: none"> <li>• <i>Loading Model and Support Cartridges</i> was updated to include new print mode (High Quality High Speed).</li> <li>• <i>Changing Printing Materials</i> was updated to include new print mode (High Quality High Speed).</li> <li>• <i>Using This Guide</i> was updated to provide information about how to get the latest revision of the document and how to send feedback.</li> <li>• <i>For More Information</i> was removed.</li> <li>• <i>Additional Resources</i> was renamed to <i>Stratasys Online Resources</i> and updated to include information about the Online Stratasys Academy including the Stratasys Academy YouTube Channel.</li> </ul>
Rev. G	July 2022	<i>Copyright</i> was updated to include an FCC Compliance section with Customer Support contact information.
Rev. H	December 2022	<ul style="list-style-type: none"> <li>• <i>Patents</i> was updated to include the UKCA mark.</li> <li>• <i>Removing the Support Material</i> was updated to refer to TrueDent Best Practice and include a new WSS150 method.</li> <li>• Other minor corrections.</li> </ul>
Rev. I	January 2023	Minor corrections
Rev. J	January 2023	<i>Patents</i> was updated.



## Stratasys Online Resources

Stratasys encourages you to learn more about additive technologies and your Stratasys printer. A wealth of information is available on our online platforms.

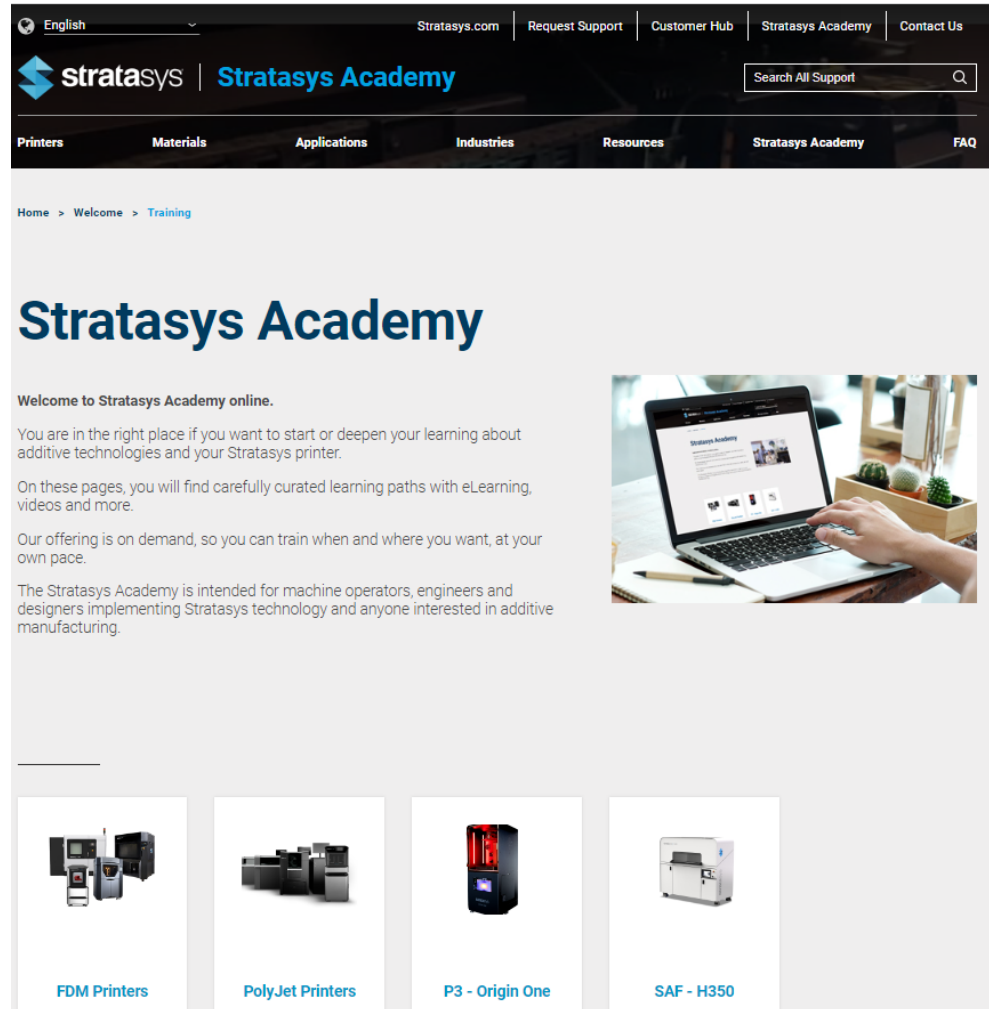
[Subscribe](#) to our customer newsletter for quarterly updates on Stratasys knowledge and training. You can learn about the release of new documentation and learning resources.

### Stratasys Academy

[Stratasys Academy](#) is your online learning platform where you can quickly learn and acquire skills on additive technologies and your Stratasys printer.

To guide you in your learning, our online academy provides a variety of resources such as an extensive library of videos and eLearning modules. We periodically update the site with new content.

Start your learning journey today.



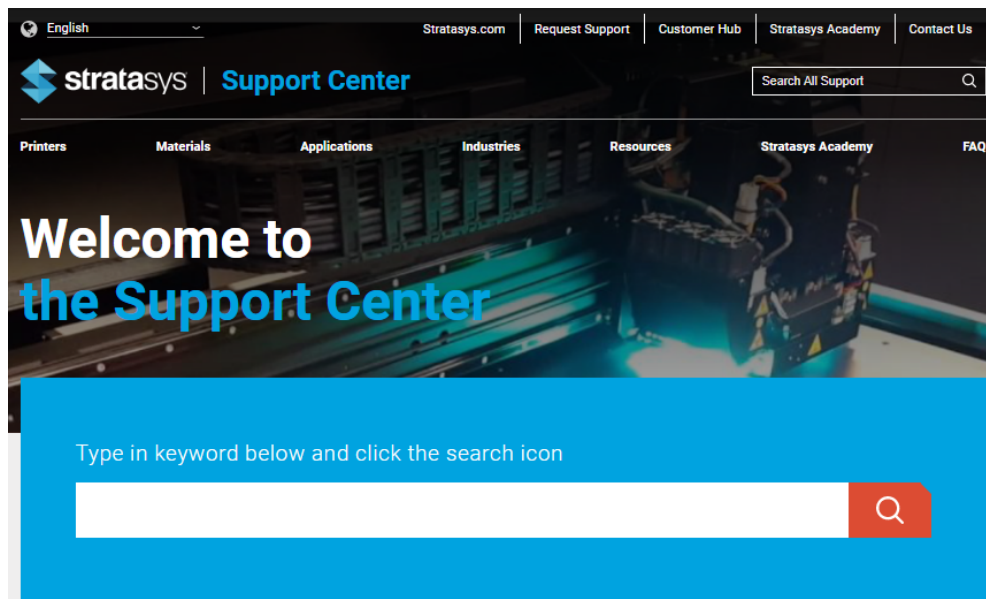
The screenshot shows the Stratasys Academy website. At the top, there is a navigation bar with links for "Stratasys.com", "Request Support", "Customer Hub", "Stratasys Academy", and "Contact Us". Below this is a search bar labeled "Search All Support". A secondary navigation bar includes "Printers", "Materials", "Applications", "Industries", "Resources", "Stratasys Academy", and "FAQ". The main content area features a breadcrumb trail: "Home > Welcome > Training". The title "Stratasys Academy" is prominently displayed. Below the title, a welcome message reads: "Welcome to Stratasys Academy online. You are in the right place if you want to start or deepen your learning about additive technologies and your Stratasys printer. On these pages, you will find carefully curated learning paths with eLearning, videos and more. Our offering is on demand, so you can train when and where you want, at your own pace. The Stratasys Academy is intended for machine operators, engineers and designers implementing Stratasys technology and anyone interested in additive manufacturing." To the right of the text is an image of a person's hands using a laptop. Below the text, there are four product category tiles: "FDM Printers", "PolyJet Printers", "P3 - Origin One", and "SAF - H350", each with a representative image of the printer.

## Stratasys Support Center

The [Support Center](#) is a knowledge base that includes information about design, applications, printing material, and links to many other resources.

In addition, you can check the latest revision of the user guide for your Stratasys 3D printer and download documents in different languages.

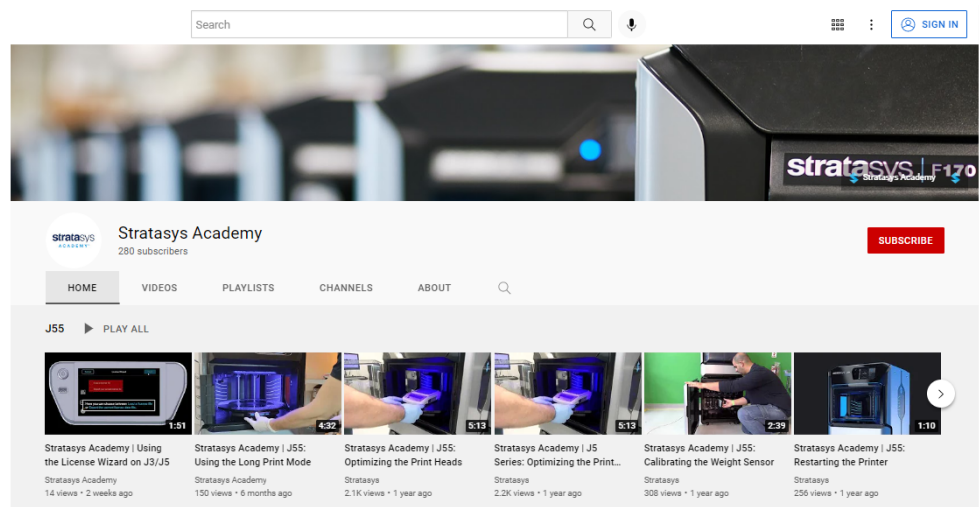
The Support Center is available in multiple languages. You can change the display language using the language drop-down menu in the top-left corner of the homepage.



## Stratasys Academy YouTube Channel

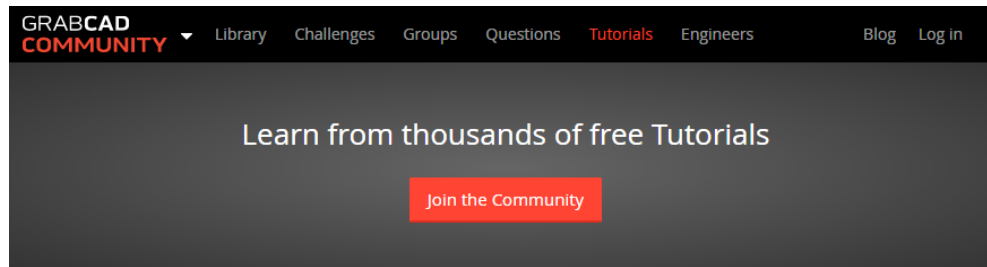
The [Stratasys Academy YouTube Channel](#) features instructional videos about how to operate and maintain Stratasys printers. The channel includes dedicated playlists for different printers and special topics like post-processing.

Make sure to check out this new Stratasys Academy Channel and remember to subscribe!



## GrabCAD Community

The [Tutorials section of the GrabCAD Community](#) portal is a valuable resource for Stratasys-sponsored and user-generated 3D printing tips. You can also ask 3D-related questions on the portal and download free CAD files.



# 2

## Safety

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## Safety Features

Stratasys 3D printers are designed to comply with CE and FCC standards. They are equipped with the following safety features:

### Interlock Switch

The power supplied to the UV light is turned off when the door is opened.



#### Warning

**Do not defeat (override) the interlock switch.** Doing so could result in serious personal injury. If the interlock switch does not function correctly, do not use the printer, and contact your service provider.

### Safety Lock

The door is locked while the printer is working. If you do manage to open it, the UV light and the motors turn off.



#### Warning

**Do not defeat (override) the safety lock.** Doing so could result in serious personal injury. If the safety lock does not function correctly, do not use the printer, and contact your service provider.

### UV Screening

The transparent sections of the door and sides block harmful UV radiation, allowing the operator to view the 3D prints during the printing process.

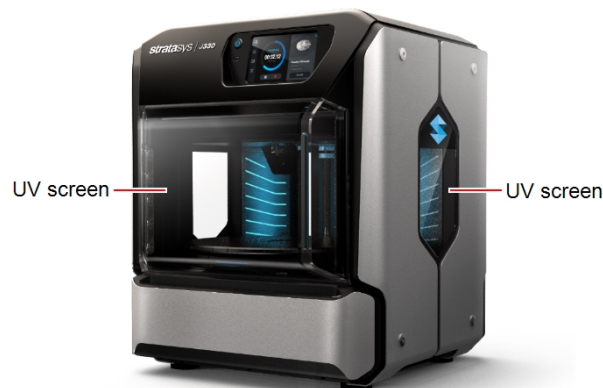


Figure 2-1 Front view of the printer

### Grounded Chassis

The chassis of the printer is grounded, to prevent electrical shock.





**Note:** The power outlet must be grounded in accordance with the local electric code to provide this protection.



If the printer is not used as specified in this guide, these safety features may not provide adequate protection.

## Symbols and Warning Labels

The following table lists the warning labels located on or in the printer.

Warning Symbol	Meaning	Location	Comments
	Hazard (general)	On the name plate on the back of the printer.	Read the instructions in this document before operating the printer.
	Hot surface	On the print block.	Risk of burns. Do not touch this surface after printing.
	Ultraviolet radiation	Near the UV lamps. On the UV module.	Risk group 3 UV emitted from this product. Avoid eye and skin exposure to unshielded product.
	Sharp object	Inside the materials cabinet.	Risk of injury from the needle in the cartridge slots.

## Safety Guidelines

The following general guidelines, together with the instructions provided throughout this user guide, ensure user safety while operating and maintaining the system. **If the system is not operated as specified, the user's safety may be compromised.**

### Printer Installation

- Installation and removal of the printer should only be done by qualified service personnel.
- Connect the printer (and the UPS unit) to the electric outlet using a power cable that is safety-certified.
- The electric outlet should be easily accessible, near the printer.
- Never connect the power plug to an outlet that does not have a ground (earth) wire, and never disconnect the ground. Doing so might expose the operator to serious danger from electric shock.
- Do not connect the power cable supplied with the printer to any other equipment.
- The following safety statement is followed by translations to Finish, Norwegian, Swedish and Danish, as required by local regulations:  
“The machine must be connected to a grounded power outlet.”
  - FI: Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan.
  - NO: Apparatet må tilkoples jordet stikkontakt.
  - SE: Apparatens skall anslutas till jordat uttag.
  - DK: Apparatets stikprop skal tilsluttes en stikkontakt med jord, som giver forbindelse til stikproppens jord.
- Leave a minimum of 60 centimeters (24 inches) between the printer and walls or other objects.
- **For Japan:** The power cable supplied is provided for connecting the printer to the AC electric source. Do not use it with other equipment.

### Printer Operation

- This printer should not be installed in locations where children are likely to be present.  
Cette imprimante ne doit pas être installée dans des lieux pouvant accueillir des enfants.
- The printer should only be operated by persons trained by an authorized Stratasys representative.
- All persons operating or maintaining the printer should know the location of first aid and emergency equipment and how to use it. **Never block access to this equipment.**
- Keep fingers and other body parts clear of the printer when closing the door.
- Never attempt to open the printer while it is working.
- Never override the interlock safety switch.

- If the interlock safety switch ever fails, **do not use the printer**.
- Several parts of the printer remain extremely hot even after it has stopped operating. Avoid touching the print block.

## UV Radiation

The UV light used in the printer emits dangerous radiation.

- If the UV light remains on when the printer is open, do not stare directly at it. Shut down the printer and call your Stratasys service provider.

## Printer Maintenance

- Service operations should be performed only by qualified personnel who have been instructed in relevant safety precautions.
- Notify co-workers and those who have access to the printer before beginning non-routine and hazardous work.



Report any potential dangers and safety-related accidents to your safety officer or to other appropriate authorities.

## Model and Support Materials

Model and support materials are made of chemical substances. Although precautions must be taken when handling these materials directly, all model and support materials used by the printer are handled in sealed cartridges. Normally, operators of the printer should never be directly exposed to hazardous materials. In the unlikely event of a leak or spill, follow the instructions that are included with the material cartridges used.

- Store model and support materials indoors, in a dry area with adequate ventilation, between 15-25 degrees Celsius (59-77 degrees Fahrenheit). Never expose them to flames, heat, sparks, or direct sunlight.
- Keep model and support materials away from areas where food and drink are stored, prepared and consumed.
- Uncured printing material is considered a hazardous substance, requiring certain precautions when directly handling it. To prevent skin irritation, wear **neoprene** or **nitrile gloves**. If there is any chance that model and support materials might splash into the eyes, wear safety goggles. Prolonged direct contact with printing materials can cause an allergic reaction.
- When handling UV-cured 3D prints that may not be completely cured on the surface, common latex gloves are adequate.
- To prevent respiratory irritation, ventilate areas where model and support materials are used. If the printer is not equipped with an exhaust duct, the room ventilation system should replace the air 4–6 times per hour.
- Clean up model-material and support-material spills with disposable towels or other absorbent, non-reusable material, such as sawdust or activated charcoal. Rinse the spill area with denatured or isopropyl alcohol (IPA), followed by soap and water. Dispose of the absorbent material in accordance with local regulations.



- Do not wash contaminated clothing at home; clothing should be professionally laundered.
- Dispose of contaminated shoes, belts and other leather items in accordance with any applicable regulations. Absorbed printing material may re-expose the user when these items are worn.

## First Aid for Working with Printing Materials

In general, try to avoid direct contact with uncured printing material. If skin or eyes come into contact with it, wash the area immediately and thoroughly with water, and follow these first-aid instructions.



The Material Safety Data Sheet (MSDS) that accompanies printing materials contains important safety information. Keep this in an accessible place where these materials are used and stored.

### Contact with Skin

If uncured printing material comes in contact with skin, wash the affected area immediately and thoroughly with soap and cool water, then remove contaminated clothing. Pay particular attention to flushing the hair, ears, nose and other parts of the body that are not easily cleaned.

- Use cool water to prevent skin pores from opening, so that the liquid material does not easily penetrate the skin.
- Do not use solvents to clean skin.
- If large areas of skin have been exposed, or if prolonged contact results in blisters, seek medical attention. In any case, if irritation persists, seek medical attention.
- Avoid the accidental transfer of printing material from the hands to other areas of the body, especially to the eyes.
- If protective cream was used, do not reapply it until the skin has been completely cleansed.

### Contact with Eyes

If uncured printing material comes in contact with the eyes, flush immediately with large amounts of water for 15 minutes and seek medical attention.

- Avoid sunlight, fluorescent light, and other sources of ultraviolet radiation. Wearing contact lenses when handling liquid printing materials is not recommended. If the liquid splashes into the eyes when contact lenses are worn, immediately remove the lenses and flush the eyes with water.
- Clean and disinfect the contaminated lenses.
- Do not wear contact lenses until eye irritation disappears.

### Ingestion

If printing material is swallowed, refer to the instructions included with the cartridge. **Seek medical attention immediately.**

## Inhalation

Vapors from printing materials can be irritating to the respiratory system. If respiratory irritation occurs, expose the victim to fresh air immediately.

- If the victim has stopped breathing, perform artificial respiration or cardiopulmonary resuscitation.
- Seek medical attention immediately.
- Keep the victim warm but not hot.
- Never feed anything to an unconscious person.
- Oxygen should be administered by authorized personnel only.

## Waste Disposal

Fully cured 3D prints can be disposed of as ordinary office trash. However, special care is required when handling printer waste (uncured printing material).

- When removing the waste cartridge/container from the printer, wear neoprene or nitrile gloves.
- To prevent liquid waste from splashing into the eyes, wear safety goggles.
- Liquid waste from the printer is classified as hazardous industrial waste. Therefore, printing-material waste must be packaged and disposed of in a manner that prevents human contact with it and contamination of water sources.
- Empty model-material and support-material cartridges contain residue of their contents. Some leakage of this residue may occur through the broken cartridge seal. Therefore, handle and store empty cartridges with care.
- Do not attempt to reuse empty cartridges, and do not puncture them.
- Dispose of used cartridges and waste containers in accordance with local regulations.
- Discard contaminated clothing, shoes, empty containers, etc., in accordance with any applicable regulations.

# 3

## Introducing the 3D Printer

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## Basic Features

Stratasys J5 Series printers offer the following options:

- You can streamline and economize the process of producing models.
  - Printing models made from different materials on the same build tray (“mixed tray”), in the same print job, eliminates the time-consuming need and expense of loading another material, flushing the system, and sending a separate job to be printed.
  - Alternating print jobs that use any of the Model materials (or material combinations) loaded similarly does not require material replacement—again, saving time and expense.
- You can print objects with combinations of basic materials (*digital materials*), enabling you to choose from a wide range of possible mechanical properties.
- You can print parts (shells) of the same model—simultaneously—with different materials (or material combinations)
- You can mix any combination of base materials, resulting in an extremely wide range of available colors.
- If you designate colors for parts of a model at the design stage (with CAD software) and save the model as a VRML file, the parts are automatically assigned appropriate material combinations in GrabCAD Print for printing the model with the desired colors.

GrabCAD Print supports many 3D CAD file formats, eliminating the need to convert them to STL files. GrabCAD Print can also repair damaged files before sending them to the printer.

## Electrical Specifications

### Printer power rating

The printer power rating is as follows:

- 100-240 VAC, 50/60 Hz, 10 A, 650 W

Other electrical outlets should not be connected to the same line as the printer.

### Actual power consumption

- Maximum: 551 Watt (during printing)
- Minimum: 79 Watt (when printer is idle)

## Work Configurations

Stratasys J5 Series 3D printing systems can be set up as single-station systems or as multi-station systems. When connected to a local computer network, the system can serve multiple users. In such configurations, each user (client) prepares files for production. A software service, installed on the printer computer, processes jobs and controls the printing.

Figure 3-1 shows the printer set up in a multi-client configuration.

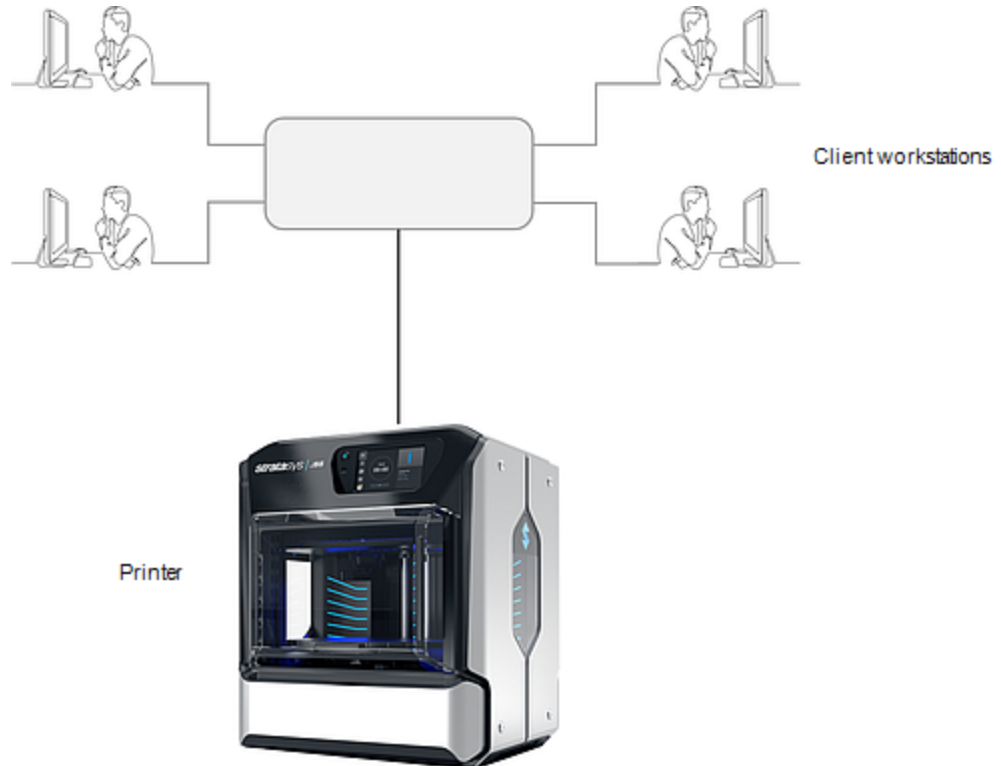


Figure 3-1 Multi-client network configuration

## Workstation Requirements

GrabCAD Print is an application for preparing and managing print jobs on Stratasys J5 Series printers (and on other supported 3D printers).

- To download GrabCAD Print, go to: [help.grabcad.com/print/sign-up](http://help.grabcad.com/print/sign-up).
- If there are several users in your company, you need to set up a company. To do this: [help.grabcad.com/article/203-all-about-company-accounts](http://help.grabcad.com/article/203-all-about-company-accounts)
- To see the requirements for client computers running GrabCAD Print, go to: [help.grabcad.com/print/system-requirements](http://help.grabcad.com/print/system-requirements).

## Source Files

Stratasys J5 Series printing systems produce 3D prints designed with most CAD tools and some other 3D applications.

GrabCAD Print supports STL, VRML, OBJ and 3MF files. In addition, GrabCAD Print supports native CAD formats from these programs: Creo, SOLIDWORKS, NX, CATIA and Inventor. To see the complete list of file formats supported by GrabCAD Print, go to: [help.grabcad.com/print/file-formats](http://help.grabcad.com/print/file-formats).

J5 Series systems feature the capability of producing different types of files simultaneously.

### **IMPORTANT: Patient Privacy**

To protect patient's privacy, before importing the source file into GrabCAD Print, make sure that file does not contain sensitive and confidential patient health information.

## STL Files

STL is short for *STereoLithography* or *Standard Triangulation Language*. This language views any object as a collection of surfaces, and describes each surface of the object as a collection of triangles.

For example, a square can be described as two triangles; a cube (six squares) as 12 triangles. Curved surfaces need more triangles to describe them. The higher the tolerance (for smooth surfaces), the more triangles are needed.

Most CAD software can export STL files. GrabCAD Print opens these files for printing on the printer.

## VRML Files

VRML is a 3D file format which includes color and texture information. VRML provides the ability to apply different colors and textures to a 3D print while designing in a CAD program. No further color assignment is needed in GrabCAD Print.

When you create a VRML file in most CAD programs, two files are created: a *wrl* file, containing the 3D print's geometric information, including texture, and a picture file (*bmp*, *png*, *jpg*, or *tiff*), containing the 3D print's color information. Before placing a VRML file on the build tray, make sure that the VRML file and its corresponding picture file are in the same folder.

## Slicing Resolution

The slicing resolution is as follows:

**X** = 300 DPI

**Y** = 300 DPI

**Z** = 1354 DPI (18.75 $\mu$  layer thickness)



## Printing Materials

Stratasys J5 Series printers produce 3D prints by jetting thin layers of printing materials on the build tray, until the complete 3D print is formed. Two types of material are used in this process:

- *Model* material—which makes up the finished 3D print.
- *Support* material—which fills gaps and spaces in the part during printing, and is removed after printing.



For up-to-date information about PolyJet printing materials and their properties, go to [www.stratasys.com/materials/polyjet](http://www.stratasys.com/materials/polyjet).

### Storage

Materials used for producing 3D prints with J5 Series printers are made of resins, which are composed of reactive monomers and oligomers. Although printing materials are supplied in sealed, UV-proof cartridges, care must be taken when storing and handling them. Follow these guidelines to protect operators and the environment, and to ensure optimum results.

- To ensure product stability, do not allow these materials to come into contact with metal. Plastics made from monomer-soluble substances (such as polystyrene or polyvinyl chloride) are not suitable for storing PolyJet printing materials.
- When not in use, keep material cartridges tightly sealed to prevent contamination, the effects of exposure to UV radiation, and accidental spillage.
- Store material cartridges indoors, in a dry area with adequate ventilation, between 15–27 degrees Celsius (59-81 degrees Fahrenheit). If exposed to heat or flames, cartridges might burst or ignite.
- Signs of premature polymerization in material cartridges include bulging, leaking, the emission of heat, and unusual odor. Exposure to heat can cause resin to gel in the cartridges.
- Make sure that material cartridges are stored in accordance with all local regulations and other applicable requirements.

### Shelf Life

Materials used for producing 3D prints have a limited shelf life. The expiry date on the label is valid when properly stored in an undamaged, unopened cartridge. Always rotate your stock, so that the cartridge with the earliest date is used first.

### Exposure to Light

If printing materials are not in their sealed cartridges, make sure to shield them from sunlight and other sources of UV radiation, such as fluorescent and

mercury-vapor lights. Exposure to UV radiation causes an increase in viscosity and, eventually, solidification.

## Safety Considerations

Before being cured, resins are hazardous materials. To prevent possible health hazards, follow these precautions regarding printing materials:

- Do not expose to flames, heat or sparks.
- Prevent contact with skin and eyes.
- Ventilate areas where they are handled.
- Keep them separate from food and drink.

Cured plastic parts, however, are safe. They can be handled and stored without precautions.



You can find more safety information about resins in:

- "Safety Guidelines" on page 2-4
- "First Aid for Working with Printing Materials" on page 2-7

## Disposal

Dispose of cartridges of model and support material in accordance with all applicable laws and regulations.

## Work Environment

Extreme heat and humidity conditions can adversely affect the operation of your J5 Series 3D printer. Use ventilation or air-conditioning systems, if necessary, to keep the work area within the following ranges:

- 18°–25° C (64°–77° F)
- 30%–70% relative humidity

# 4

## Operating and Maintaining the Printer

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## Starting the Printer



### Caution

- Do not attempt to operate the printer before being trained by an authorized Stratasy representative.
- Observe all safety warnings and follow the safety guidelines described in Chapter 2.

1. Make sure that the main power switch, at the back of the printer, is in the ON position.

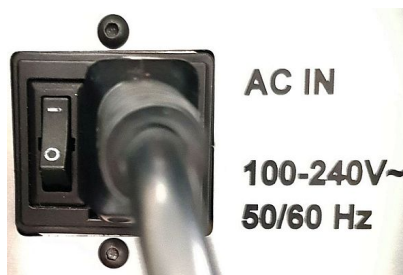


Figure 4-1 Main power switch and cable

The power button on the front of the printer blinks.



Figure 4-2 Power button

2. Press the power button.  
Powering up the printer can take several minutes.
3. When the following screen appears, make sure that the printer door is closed, and tap OK.

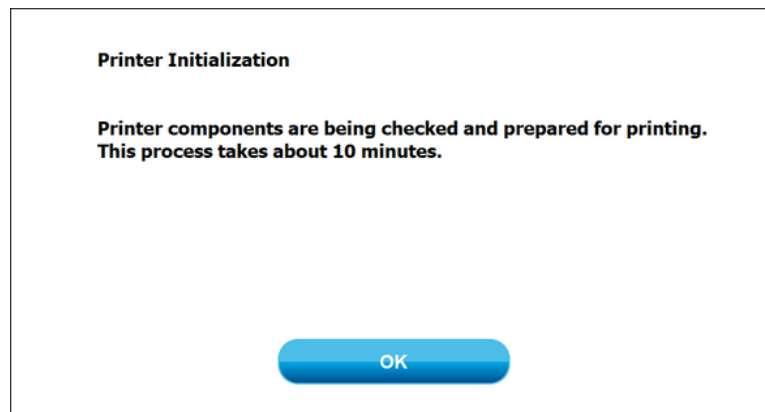


Figure 4-3 Hardware Initialization screen

When the printer powers up, the user interface is displayed on the touch screen. All monitoring and controlling of the printer is done from this interface.

The printer is ready for all operations when "Idle" is displayed.

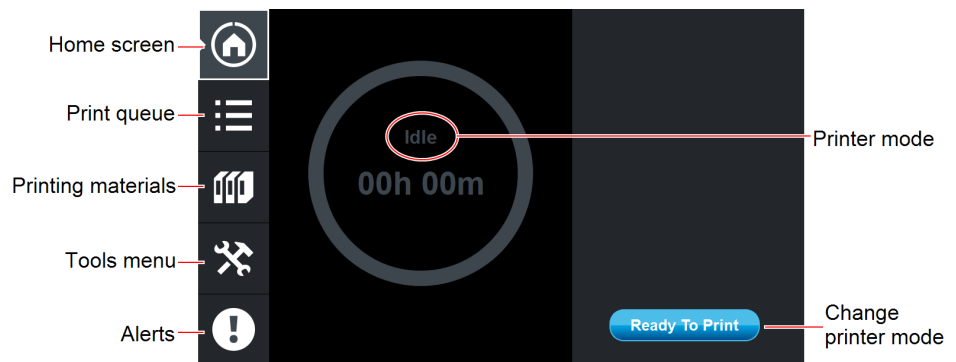


Figure 4-4 Printer interface (Home screen)

## Loading Model and Support Cartridges

The number of materials loaded in J5 Series printers depends on the active printing mode. Each cartridge contains 1.1 kilograms of material when full.

- In High Quality Speed mode, you print 5 different model materials and 1 support material. Two cartridges of each type of material can be loaded in the material cabinet (upper and lower bay) for each channel.



Figure 4-5 Material cabinet setup for High Quality Speed mode

- In Long Print mode, you print 2 different model materials. Four cartridges of each type of material can be loaded in the channels of the same head (upper and lower bays). In addition, 4 support material cartridges are loaded in the support channel (in the upper and lower bays).
- In High Quality High Speed mode (J5 DentaJet only), you print 2 different medical model materials. Four cartridges of each type of material can be loaded in the channels of the same head (upper and lower bays). In addition, 4 support material cartridges are loaded in the support channel (in the upper and lower bays).



Figure 4-6 Material cabinet setup for Long Print and High Quality High Speed modes

A graphical representation of the cartridges loaded and their current weight appears in the user interface.

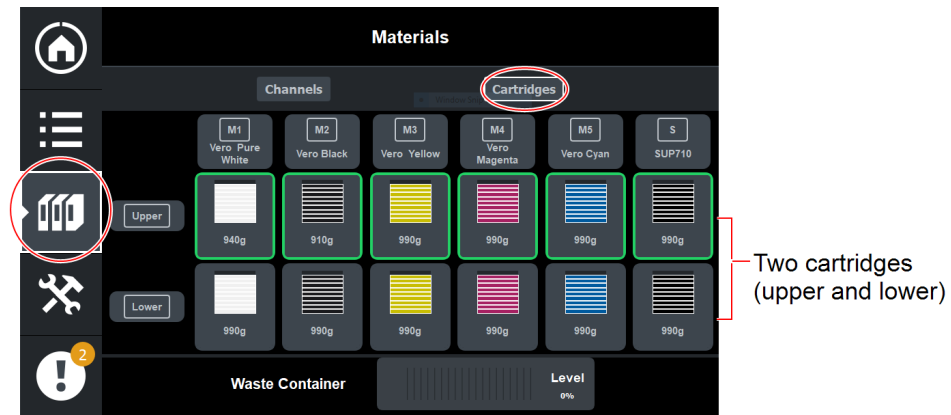


Figure 4-7 *Materials* screen, showing cartridges

To display this screen, tap the *Materials* icon on the left, and the *Cartridges* tab at the top, as shown.

The *Channels* tab displays the total amount of material available for each channel, from both upper and lower cartridges.



To load printing materials after printer installation and after a long shutdown, use the *Material Replacement* wizard.

**Important:** If you need to replace the printing material currently installed with another type, see "Changing Printing Materials" on page 4-19. Otherwise, make sure to replace the material cartridge with one containing the same type of material.

#### To load model and support material:

1. Open the material cabinet.
2. Load model and support cartridges into their respective compartments.

**Note:** Make sure that the cartridges contain at least 50 grams of material.

**Note:** Repeated piercing of the cartridge seal can cause leakage. To avoid leakage from the seal, do not pierce the seal more than 10 times.

3. The printer interface displays the new cartridge after a short delay. Check the interface to make sure that the correct material is detected and that its weight is displayed.
4. Close the material cabinet.

#### Tips about loading and replacing material cartridges:

- You can replace material cartridges either before or during printing.
- You can load partially used cartridges, provided that they contain more than 50 grams of material. Otherwise, some wizards will not be able to run.
- You can replace a partially used cartridge to avoid the need for replacing it during printing.



- The cartridge type is automatically detected by the printer. If you replace a cartridge containing different Model material, a message appears recommending that you run the Material Replacement wizard to flush out the old material.
- If the printer is not level, some of the printing material might not be used, and air might be drawn into the material tube.
- If printing stops for an extended time before you replace a material cartridge, the printer may go into *Idle* mode. If this happens, see "Resuming Production After Printing has Stopped" on page 4-15.



The material cabinet and material cartridges contain components that identify loaded printing materials.

Tampering with these components will render the printer inoperable and may void Stratasys warranties and service contracts.

## Producing 3D Prints

3D prints can be produced after they are arranged on the virtual build tray in the GrabCAD Print application. For information about preparing files for printing, see the GrabCAD Print [online documentation](#).

### Locking the Build Tray

Locking the build tray is required when you need to remove printed models after a print job and when performing some of the operator tasks, such as cleaning the build tray or taping the pink paper to tray for the Pattern Test. When done, unlock the tray.

#### To lock and unlock the build tray:

1. Press the *Push* button to lock the tray in place.
2. With the tray locked, perform the required task.
3. When done, pull the handle under *Push* button upward and unlock the tray.

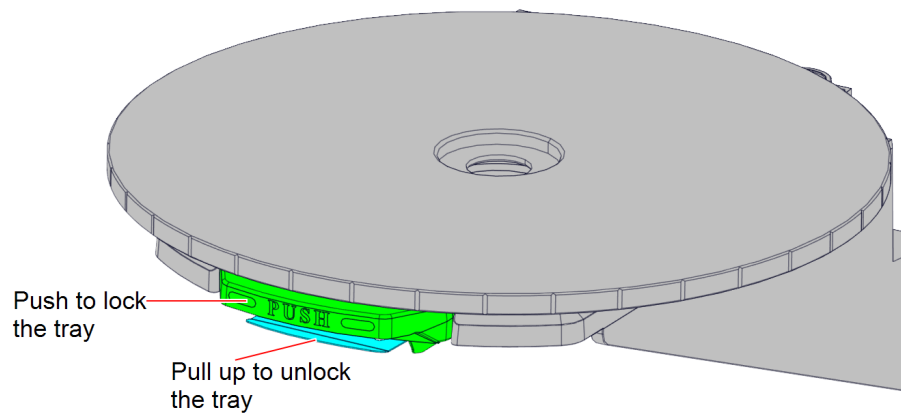


Figure 4-8 Tray *Push* button and unlocking handle

### Preparing the Printer

Before beginning to produce 3D prints, it is recommended that you check the current printing quality of the print heads by performing the Pattern Test.

#### To prepare the printer for printing:

1. Make sure that the build tray in the printer is empty and clean.
2. If not, lock the build tray (as described above) and remove cured material with the scraper, and clean the tray thoroughly with a cleaning cloth soaked with 90% alcohol (IPA or ethanol).



#### Caution

Use protective gloves when cleaning the build tray, and be careful of the sharp edges of the scraper blade.

3. Make sure that there is sufficient model and support material loaded, as indicated on the printer interface. You may want to replace the cartridges of model and support material currently loaded in the printer to avoid the need for replacing them during printing.

Note: When you click **Print** in GrabCAD Print, a warning message appears if there is not enough of one or more material.

For loading material cartridges and replacing empty ones, see "Loading Model and Support Cartridges" on page 4-5.

For changing the *type* of material currently loaded, see "Changing Printing Materials" on page 4-19.

## Starting Printing

There are several ways to start printing a job. You can:

- Send a job to the printer from GrabCAD Print.
- Reprint a recent job from the *History* screen.
- Load an *.objzf* file from a USB flash drive.

**Note:** Only *.objzf* files can be loaded with a USB flash drive

## Sending a Job from GrabCAD Print

You can set up the printer so that it is ready to begin printing when a job is received from GrabCAD Print.

**To send a print job from GrabCAD Print:**

1. When the printer is in *Idle* state, tap **Ready to Print**.

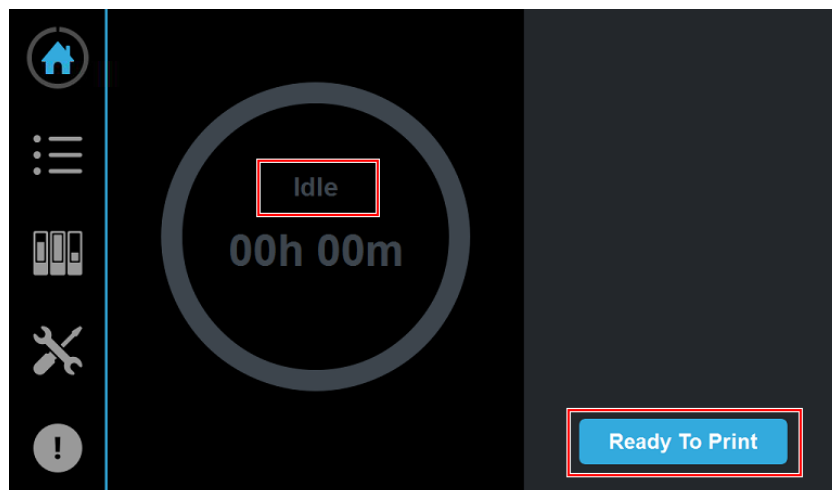


Figure 4-9 Home screen, *Idle* state, no jobs in queue

2. Make sure that the build tray is empty, close the printer door, and tap **OK**.

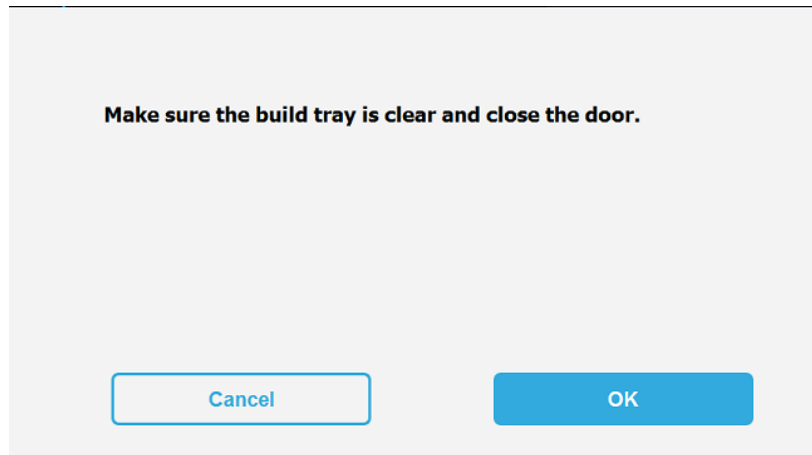


Figure 4-10 Confirmation screen

When the printer state changes to *Ready*, the printer is ready to begin printing as soon as jobs are received.

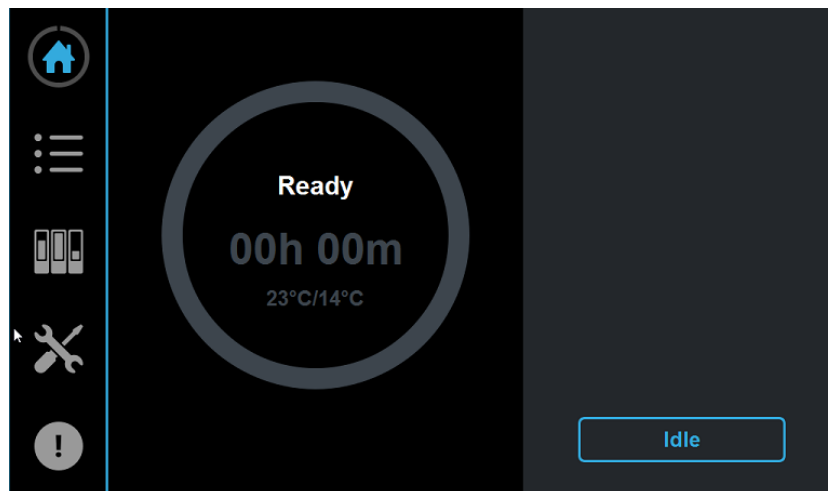



Figure 4-11 Ready state




The printer remains in this state, by default, for up to 48 hours. The length of time can be changed in *Tools > Settings > Parameters*.

3. From GrabCAD Print, send a job to the printer.  
The printer begins printing the job immediately.
- If the printer is not in *Ready* state, the job is not printed immediately. Instead, it appears in *Queue* screen in the printer application. To start printing the job, access the *Queue* screen, tap the desired job, and tap the  button.

## Loading a Job from the Print History

From the printer history, you can reprint a job.

### To print a job from the History:

1. Tap  to display the print *Queue* screen.
2. In the *Queue* screen, tap the History icon.

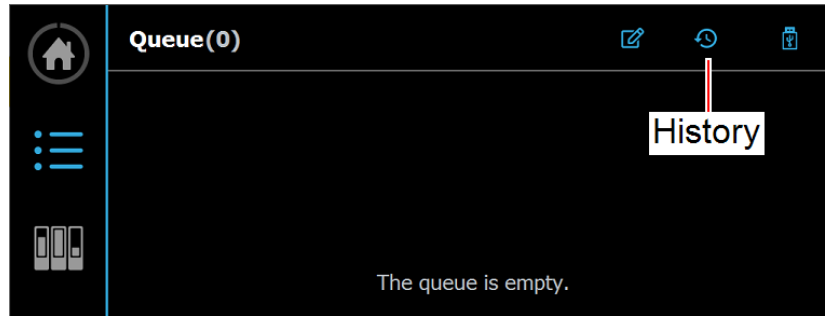


Figure 4-12 *Queue* screen, History icon

3. In the *History* screen, select a job to load.

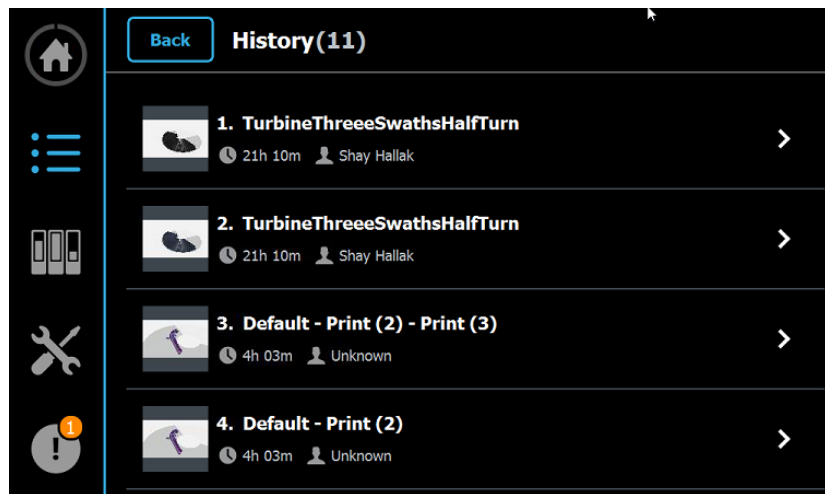


Figure 4-13 *History* screen

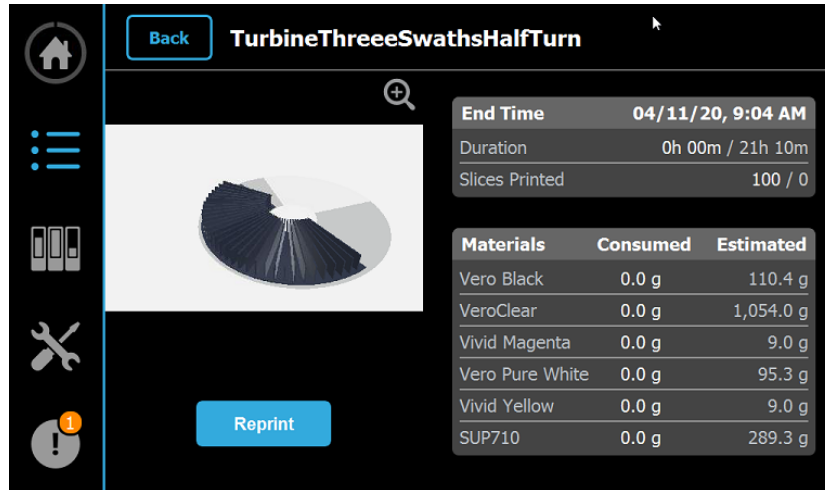

4. When the following screen appears, tap **Reprint**

Figure 4-14 Job details screen


- To begin printing, check that the build tray is clear and that the door is closed, then tap .

## Loading a Job from a USB Flash Drive

Using a USB flash drive you can load *.objzf* files to the printer application. To save the file as an *.objzf*, load the file in GrabCAD Print, and go to *File > Export OBJZF*.

**Important:** An *.objzf* file can be printed only in the version in which it was exported. If you update the software, you need to export the job file to *.objzf* again.

## To print a job from USB flash drive:

1. Tap  to display the *Queue* screen.
2. In the *Queue* screen, tap the USB icon.

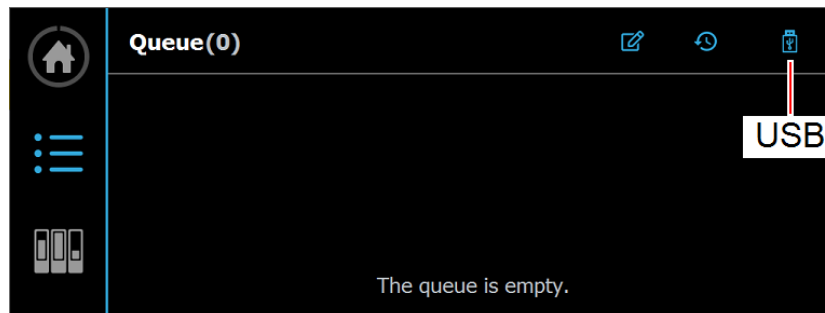


Figure 4-15 Queue screen, USB icon

3. In the screen that opens, select a job to load.

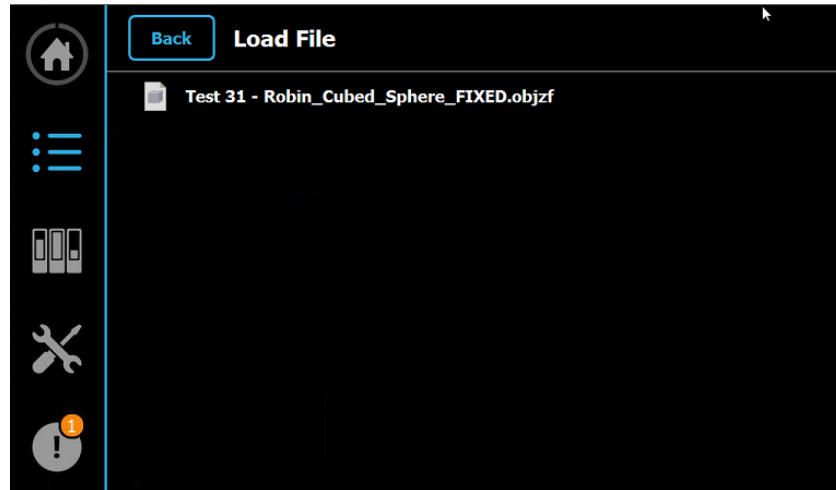


Figure 4-16 USB Load File screen

4. When the following screen appears, tap **Print**.

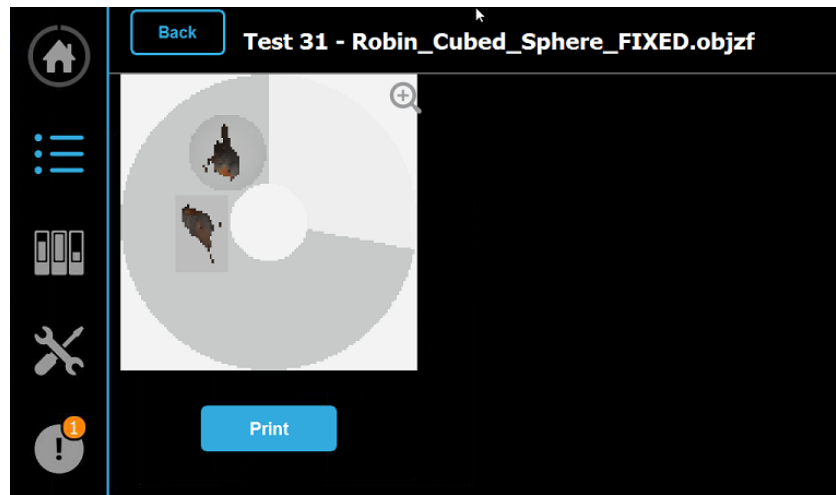



Figure 4-17 Job details screen

You can expand the preview image by tapping it.

- To begin printing, check that the build tray is clear and that the door is closed, then tap .

When printing begins, the printer state changes to *Printing*. The print block heats up, and other components prepare themselves for production.

Depending on the size of the model(s) to be produced, printing can take between several hours to several days. As long as there is enough Model and Support material in the cartridges, printing proceeds automatically until the job is finished.

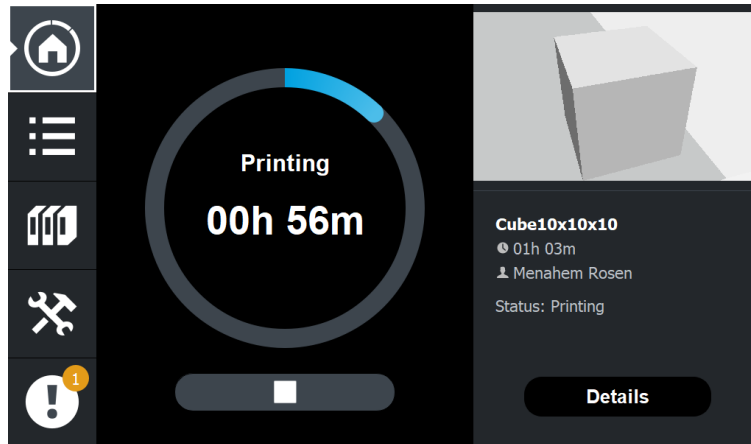


Figure 4-18 Home screen, *Printing* state



## Resuming Production After Printing has Stopped

If the printing process is interrupted, the print manager stops sending slices to the printer. This can happen, for example, if the printing material runs out in the middle of a print job, and you do not replace the empty cartridge immediately. After the printer changes to *Idle* mode, you need to resume printing, either from the printer or from GrabCAD Print Job Manger.



After printing stops, the printer goes into *Idle mode*, when heating of the print heads is reduced.

### To continue printing from GrabCAD Client :

1. Open the *Schedule* screen of GrabCAD Print.

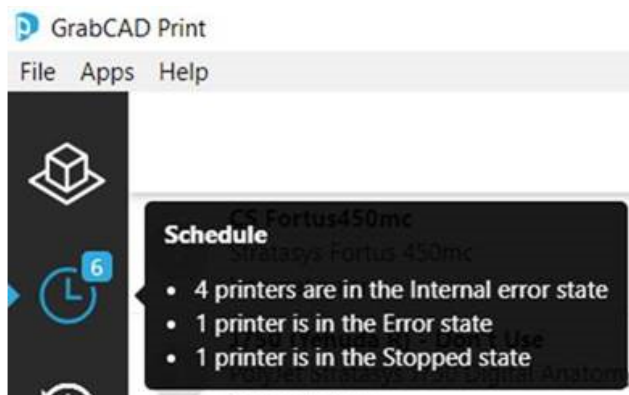


Figure 4-19 Opening the *Schedule* screen

2. Locate the stopped job.

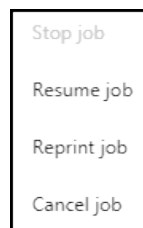


Figure 4-20 Stopped job in the *Schedule* screen

3. Click on the job to display the job details, and click the *Resume* icon

OR—

Right-click on the job to display the pop-up menu, and select **Resume job**.



4. Click **Resume Print** in the confirmation dialog box.

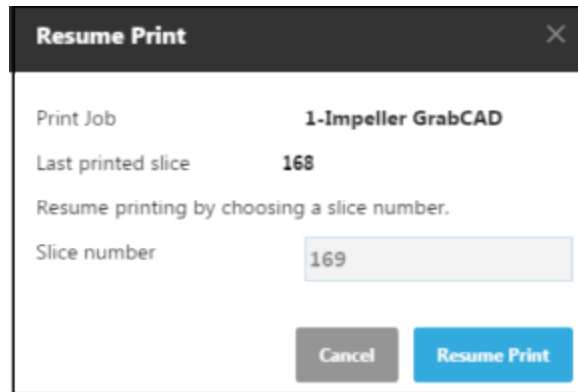


Figure 4-21 Resume Print confirmation

To continue printing from the printer interface:

1. In the *Home* screen, tap the job display area (*Details*).

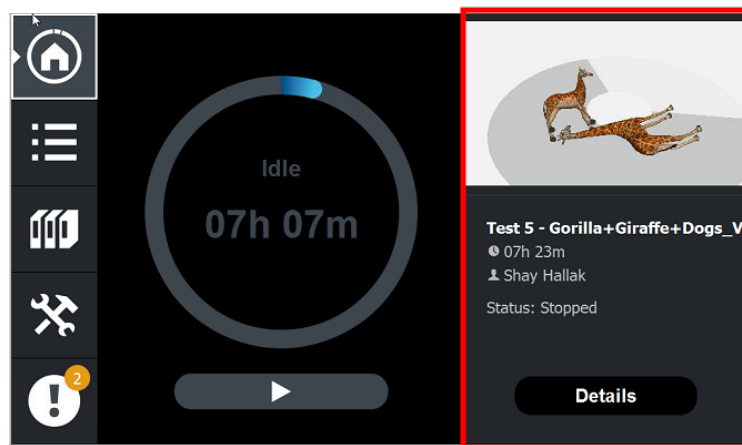


Figure 4-22 Home screen, job details

OR—

In the *Queue* screen, tap the job.

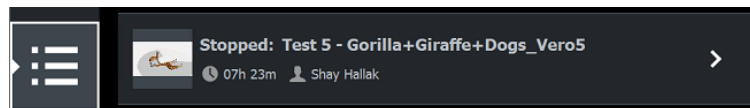


Figure 4-23 Queue screen, job details

The following screen opens, containing full job details and action options.



Figure 4-24 Job details and action options

## 2. Tap **Resume**.



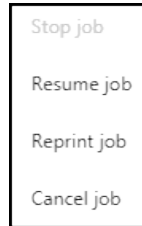
You cannot continue printing if there was a relatively long interruption in printing. This is because the part already printed might slightly deform or shrink before printing continues, causing a visible difference between it and the part printed later. The effects of a printing stoppage depend on the part size and structure, the model material used, ambient temperature and the length of the stoppage.

**If you cannot continue printing:**


## 1. Cancel the job.

In GrabCAD Print, in the *Schedule* screen (see above):

- Right-click on the job to display the pop-up menu, and select **Cancel job**.



OR—

- Left-click on the job to display the Job Status details, and click the *Cancel* icon .

OR—

- On the printer interface, display the screen containing full job details (see above), and tap **Cancel**.

## 2. Remove the partially printed 3D print from the build tray.

## 3. Resend the job to the printer.

- In GrabCAD Print: Click .

OR—

- On the printer interface: Display the screen containing full job details (see above), and tap **Reprint**.



You can stop printing from either the printer interface or from GrabCAD Print.

- After clicking the *Stop* button in GrabCAD Print, you can resume printing from GrabCAD Print or from the printer interface.
- After stopping printing from the printer interface, you can resume printing **only** from the printer interface.

## Changing Printing Materials

Before producing models using a different type of printing material than is currently installed, run the *Material Replacement* wizard to flush the print block and feed tubes.



To ensure the biocompatibility of printed parts when changing from standard printing materials to biocompatible materials, follow the instructions for loading the relevant material. To download the required document, search for "Biocompatibility Requirements" on the [Stratasys Support Center](#).

### To replace the printing materials:

1. From the *Wizards* screen, tap **Material Replacement**.



2. In the opening screen, tap **Start**.

The main material replacement screen shows the materials currently loaded in each of the Model channels (M1–M5) and in the Support channel (S).

**Note:** If you have TrueDent materials, select *Denture*.



Figure 4-25 Denture selection

3. To change the print mode, in *Print Mode*, tap >.

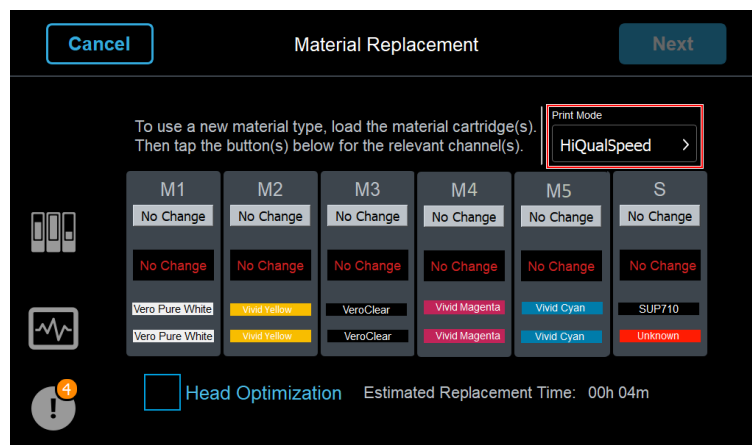


Figure 4-26 Initial Material Replacement screen (sample)

4. Select the print mode and tap **OK**.

- HiQualSpeed
- LongPrint
- HiQualHiSpeed (J5 DentaJet only)

The displayed print modes depend on the printer type.

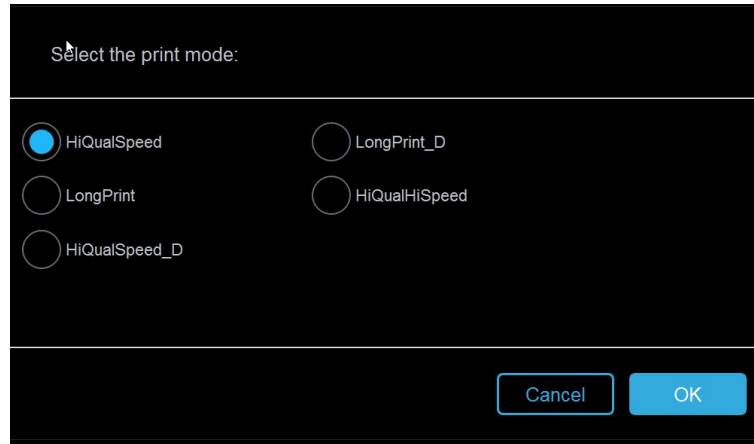


Figure 4-27 Selecting a print mode (sample)

### High Quality Speed

This mode enables you to produce 3D prints with 5 model materials. Each print head section is loaded with a different material.

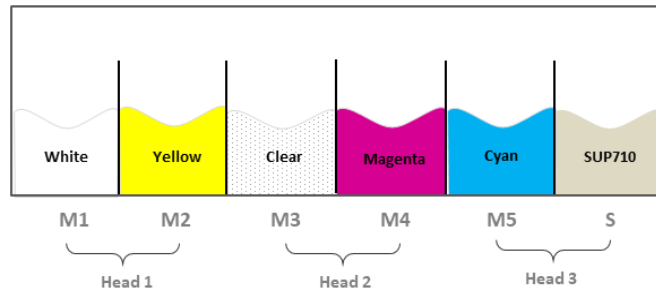


Figure 4-28 Five model materials loaded in the print heads

### Long Print

This mode enables you to load more cartridges of a single material thereby significantly reducing the need to replace cartridges during the print job. The cartridges of the material you wish to print without replacing must be loaded in the channels of the same print head, in the upper and lower bays.

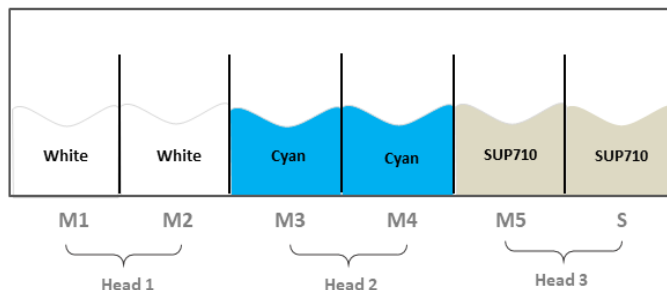


Figure 4-29 Two model materials loaded in the print heads

Tips for Long Print mode:

- In this mode, you load 2 different model materials, 4 cartridges of each material, in the channels of the same print head in the upper and lower bays, as shown in Figure 4-5 on page 4-5.
- When printing Digital ABS™ Plus in this mode, you must load 4 cartridges of RGD515™ Plus and 4 cartridges of RGD531™. The cartridges of each component must be loaded in the channels of the same print head, in the upper and lower bays.

High Quality High Speed (J5 DentaJet only)

This mode enables faster printing while maintaining model quality. The loading of the cartridges is the same as the Long Print mode.

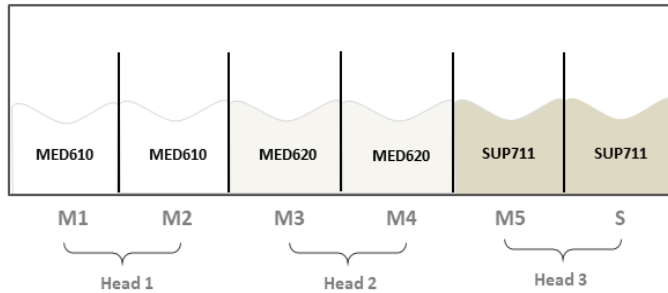


Figure 4-30 Two medical model materials loaded in the print heads

5. To change the material in a channel, replace the cartridge(s) for that channel.
6. In the wizard screen, tap **No Change** for that channel. The material selection screen appears for the selected channel.

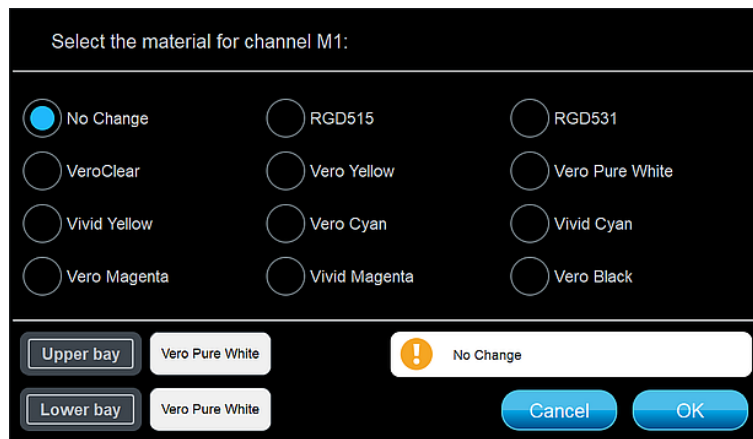



Figure 4-31 Material selection screen (sample)

The material cartridges loaded in the upper and lower bays of the materials cabinet are indicated at the bottom of the screen.

7. To replace the material in the channel, select a new material.

The message box  displays the results of your selection.

- Mismatch** indicates that the material selected is not loaded in the materials cabinet.
- Duplicate material** indicates that the new material is already loaded in another channel.

8. Tap **OK**.

The main material replacement screen appears again, where you can select another channel.

Replacing certain materials requires print-head optimization. If this is the case, *Head Optimization* is selected automatically in the material replacement screen.

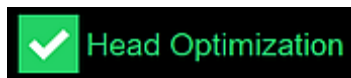


Figure 4-32 Head Optimization required

**Note:** If selected, run the *Advanced Head Optimization* wizard after completing the *Material Replacement* wizard, before printing.

9. After replacing materials in all of the required channels, note the estimated replacement time, and tap **Next**.



If you continue, you must complete the material replacement process before you can print models. To replace material cartridges at another time, tap **Cancel**. If you continue (by tapping **Next**) and you do not complete the process, you will need to run the wizard again before printing.

10. After tapping **Next**, follow the instructions in the wizard screens.

To complete the material replacement process:

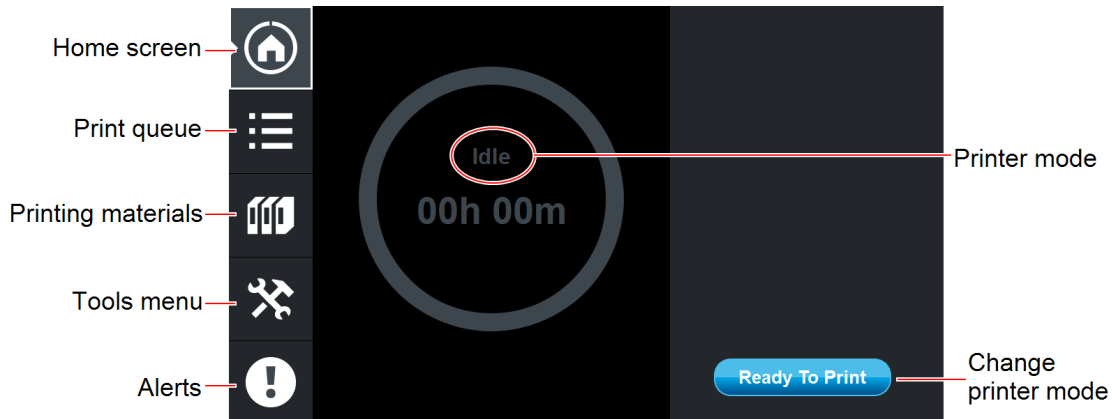
- When replacing printing materials (Model and Support) with other printing materials, the printer prints a model in the shape of an arc.
- When replacing printing materials with cleaning fluid, the printer purges.



## Printer States Between Jobs

Between printing jobs, the printer can be left in *Idle* state for up to 10 days. However, if there is a need to shut down the printer, use the Shutdown wizard to automatically perform the procedures that must be done before turning off the printer (see "Shutting Down the Printer" on the next page).

The printer state is indicated in the Home screen.



**Figure 4-33** Printer interface Home screen

After 15 minutes in *Idle* state, heating of the print heads stops.

After 15 minutes of no activity, the interface screen goes blank. To turn the screen on, touch the screen.



The default time until the interface goes blank is 15 minutes. You can change it to any duration from 1 minute to 24 hours in the printer application. To change the timeout time, navigate to: Tools > Settings > Parameters > System Power > Screen Turn Off Timeout



When the printer is in *Idle* state, do **not** turn it off with the power switch. It can remain in this state—with the door closed—for up to 10 days. Turn off the printer by running the Shutdown wizard (see "Shutting Down the Printer" below).

## Shutting Down the Printer

You only need to shut down the printer if it will not be used for more than 10 days. Otherwise, the printer can remain on, in *Idle* mode. However, if there is a need to turn off the printer sooner, use the Shutdown wizard to automatically perform the necessary processes before turning off the printer.

To properly shut down, the printer needs to perform several processes, depending on the length of time that the printer will not be used. These are controlled by the Shutdown wizard. Unless you are unable to run this wizard (because of a software error), do not shut down the printer by simply turning off the power at the switch or by disconnecting the power to the printer.



### Caution

Turning off the printer for an extended period without first running the wizard can cause serious damage to print heads and other expensive printer parts.

Depending on the length of time the printer will not be used, you can choose the most appropriate shutdown procedure.

- **Up to 10 days:** The wizard powers-down the printer without draining the print block. Use this option if you need to turn off the printer for servicing.
- **10 to 30 days:** The wizard empties the print block of Model and Support material to prevent leaks and to protect the print heads. This takes about 10 minutes.
- **More than 30 days:** The wizard empties the print block, then flushes the system with cleaning fluid. This takes up to 35 minutes, and you must be present to load cleaning-fluid cartridges when instructed.



When shutting down the printer for more than 24 hours, printing materials are drained from printer components. To avoid wasting valuable material, plan to print models at least once a week. Many printer operators use this opportunity to print customer samples or test models.

### To run the Shutdown wizard:

1. From the *Wizards* screen, select **Shutdown** or press the printer power button for 2 seconds (not more).
2. Select the option corresponding to the length of time that the printer will not be used.

**Note:** Before selecting *More than 30 days*, make sure that six (6) cleaning-fluid cartridges are available, each containing a minimum of 250 grams.

3. In the next screen, verify that the tray is empty and click **Next**.  
The shutdown procedure begins.

4. When shutting down the printer for an extended time, turn off the main power switch at the back of the printer.

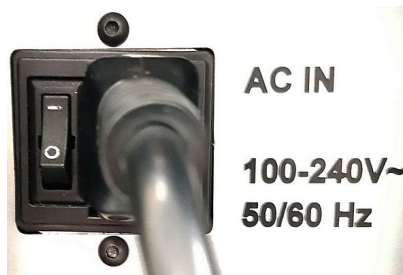


Figure 4-34 Main power switch and cable

## Updating the Printer Software


GrabCAD Job Manager and the printer software need to be updated each time a new version of GrabCAD Print is released. When a new software version is available for installation, the following alert appears.



**Note:** It is not possible to run software update on remote printers, since they are not connected to the same network as GrabCAD Print. To update the software, either connect the printer to the same network as GrabCAD Print, or use a different method, such as USB flash drive. To use the USB flash drive, contact your service provider.



### To install the software update:

1. Tap  to open the *Alerts* screen.
2. Tap the *New version is ready* alert.

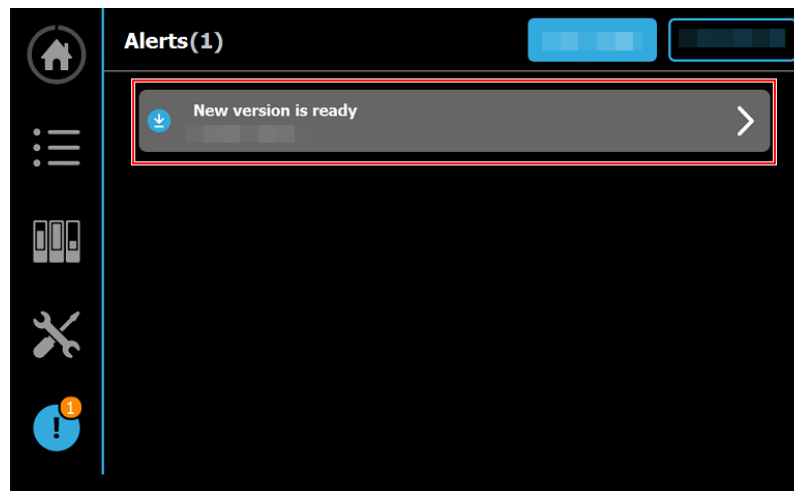


Figure 4-35 Alerts screen

3. When the message appears, tap **Go to Software Configuration**.

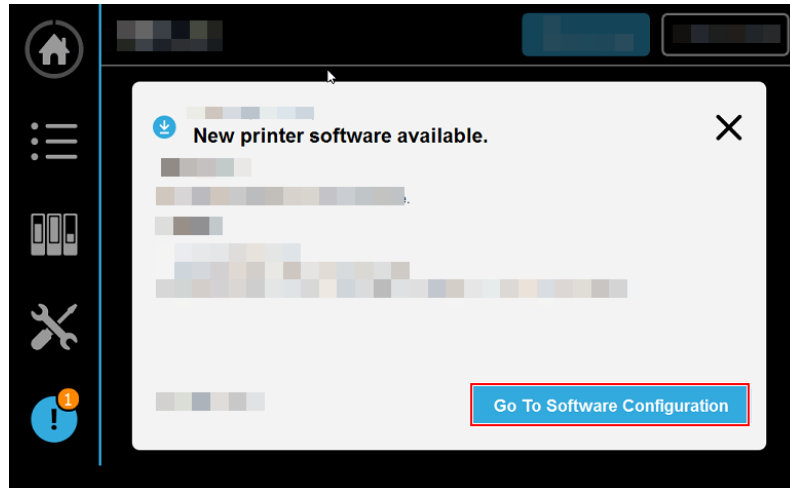


Figure 4-36 Software update message

4. In the *Software Configuration* screen, tap **Update Software**.  
**Note:** Make sure that the latest version of Job manager is installed.

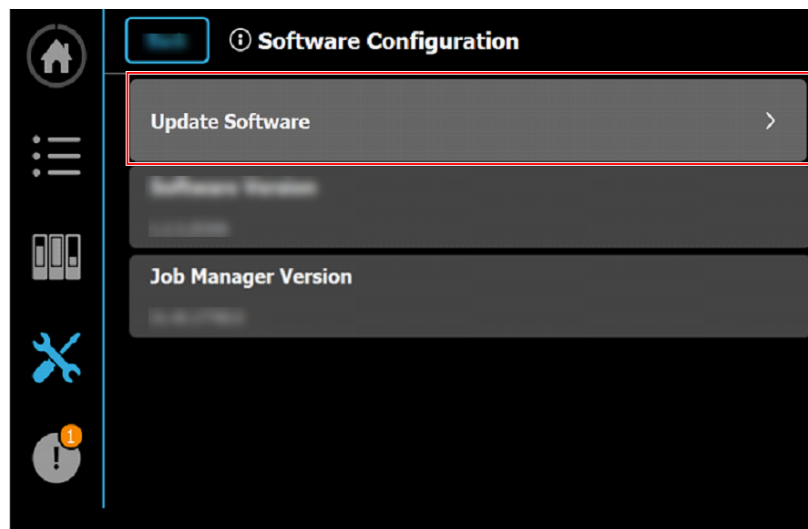


Figure 4-37 Software Configuration screen

5. Select the software version listed.

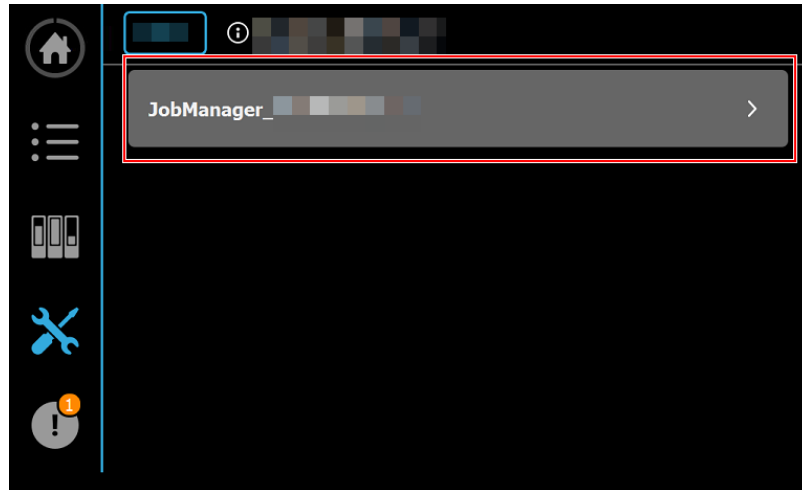


Figure 4-38 *Update Software* screen

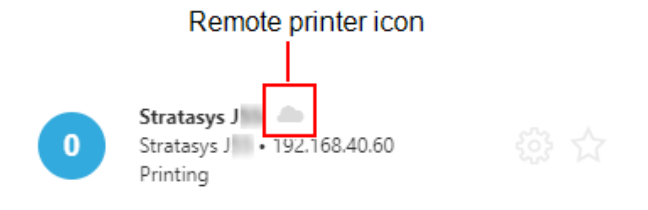
The installation wizard opens.

6. Follow the wizard until the new software version is installed.

## Sending Log Files to Service Provider

From GrabCAD Print, you can generate printer log files for diagnostic purposes and send it to your service provider for support.

**Note:** It is not possible to send log files for remote printers. To send the log files, the printer and GrabCAD Print must be connected to the same network.



### To generate and send a log file:

1. In GrabCAD Print, make sure that the printer is connected to the GrabCAD client.
2. Select the *Printer Details* icon.

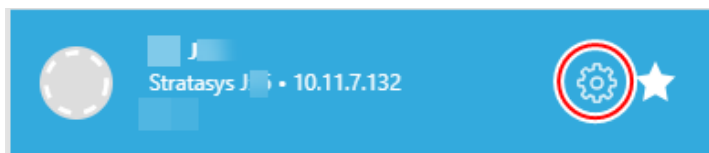


Figure 4-39 *Printer Details* icon in GrabCAD Print

3. Select **Get Printer Support**.



Figure 4-40 *Printer Details* screen



- When the following dialog box appears, enter all the required information and click **Contact Support**.

**Note:** Make sure that the *Include Project File* check box is selected. This ensures that the print job is sent together with the log files.

**Get Printer Support - My J** [X]

To help solve issues with your printer, you will need to send your printer's diagnostic files to your Stratasys service provider.

After entering the information below, click Contact Support. An email containing this information will be prepared for you to send to your service provider.

If you do not know the email of your service provider, you can find a [Stratasys support email here](#) depending on your region.

Email of service provider \*

Company name \*

Case number (if this is an ongoing case)

Type of problem \*

01/11/2020 12:38 pm

Details

Include project file

Cancel Contact Support

Figure 4-41 Get Printer Support dialog box

A printer diagnostics file is prepared and a new email message opens in Microsoft® Outlook®.

If GrabCAD Print cannot open your email client, the following message appears. Click **Copy email contents** and paste the contents into an email.

**Copy email contents** [X]

Attempting to open your windows mail application. If this does not work, you can copy email contents into your own email client and send it with any relevant attachments to your Stratasys support contact.

Cancel Copy email contents

Figure 4-42 Copy email contents message

- Send the email to your service provider.

## Maintaining the Printer

Performing routine maintenance tasks is essential for getting satisfactory results from your printer. Perform the tasks at specified intervals.

### Routine Maintenance Schedule

Frequency	Task	For More Information
Before / after printing	Routine cleaning of: <ul style="list-style-type: none"> <li>• print heads</li> <li>• roller surface</li> <li>• wiper</li> <li>• UV light</li> <li>• build tray and surrounding area</li> </ul>	See "Routine Cleaning" on the next page.
Weekly	Perform the Pattern test.	See "Pattern Test" on page 4-38.
Monthly	Clean debris from the printing chamber, when running the Routine Cleaning wizard.	
Every 300 hours of printing or every 3 months	Optimize the print heads.	See "Optimizing Print Heads" on page 4-48.
Every 3 months or every 200 hours of printing	Inspect the ProAero™ Air Extraction System, and replace the filters, if necessary.	See the Maintenance chapter of the ProAero user manual.
Every 4 months or every 650 wipes	Replace the wiper.	See "Replacing the Wiper" on page 4-41.
Every 4 months or every 500 hours of printing	Replace the roller waste collector.	See "Replacing the Roller Waste Collector" on page 4-46.
Every 3 months	Grease the Z-axis screw.	See "Lubricating the Z-Axis Screw" on page 4-80.
Once a year	Calibrate the weight sensors (load cells).	See "Calibrating the Weight Sensors" on page 4-81.
Every 2 years or every 3400 hours of printing	Preventive maintenance visit by service engineer.	Contact your Stratasys service provider.

## Customer Replacement Units

Below is a list of standard replacement parts you may need when performing routine maintenance tasks.

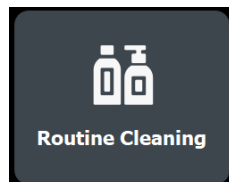
Part Name	Stratasys Part Number
Print head	MSC-08006-S
Waste container	ASY-09895-S
Wiper	ASY-09426-S
Roller waste collector	ASY-09455-S
Pre-filter for the for the ProAero Air Extraction System <sup>1</sup>	MSC-09200-S
Combined filter for the ProAero Air Extraction System	MSC-09201-S

## Routine Cleaning

Regular inspection and cleaning of the orifice plates on the bottom of the print heads prevents print nozzles from clogging. Cleaning the roller, wiper and UV light are also important for maintaining quality printing. A wizard adjusts printer components to enable access to these key areas, and it guides you through the cleaning procedure. To maintain optimum condition of printer components, run the Routine Cleaning wizard after every print job, when you remove the model from the build tray. This procedure takes about 20 minutes.

To clean the print heads, roller and wiper:

1. Prepare—
  - 90% isopropanol (IPA—*isopropyl alcohol*) or ethanol (*ethyl alcohol*)
  - disposable cleaning gloves
  - a supplied cleaning cloth or equivalent
2. From the *Wizards* screen, select **Routine Cleaning**.



3. Make sure that the printer door is closed.  
The wizard moves components to the cleaning position and adjusts the temperature of the print heads for cleaning.

<sup>1</sup>For filter replacement instructions, refer to the ProAero Installation and User Manual.

- When instructed by the wizard, open the printer.  
The wizard displays the checklist of cleaning tasks.

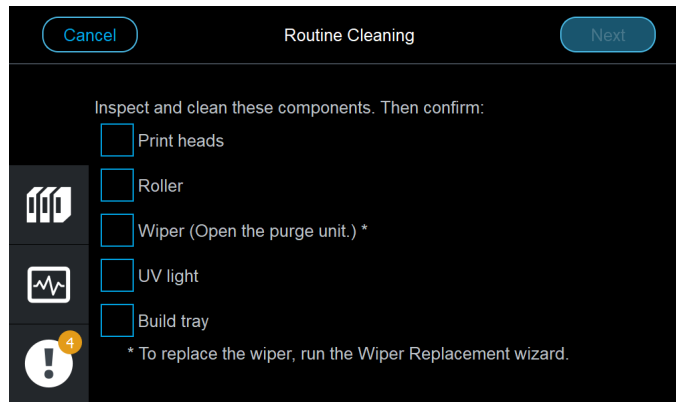


Figure 4-43 Routine Cleaning tasks

Perform the cleaning tasks in the order shown.



### Warning: Hot Surface

The print head orifice plates (bottom surface) are hot. Do not touch them with your bare hands, and proceed with caution.

- Put on the gloves.



### Caution

Uncured printing material on the print heads might cause skin irritation. Use disposable cleaning gloves to protect your hands.

- Soak the cleaning cloth with alcohol.
- Clean the print heads **gently**, with a back-and-forth motion.



Recommendation: Fold the alcohol-soaked cleaning cloth twice. Then, gently clean the heads four times, each time with another surface of the cloth.

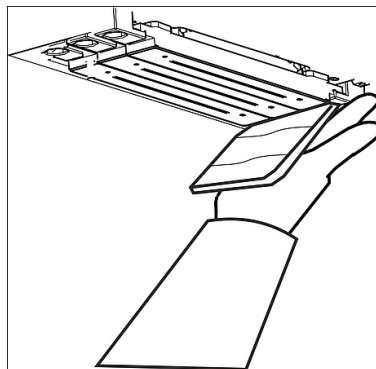


Figure 4-44 Cleaning the print heads

8. With the alcohol-soaked cleaning cloth, clean the roller surface as it is rotating.



Figure 4-45 Roller



### Caution

Use caution when cleaning the rotating roller.

9. Open the purge unit to inspect and clean the wiper.
  - a. Locate the purge unit, in the rear-left corner, behind the print heads.

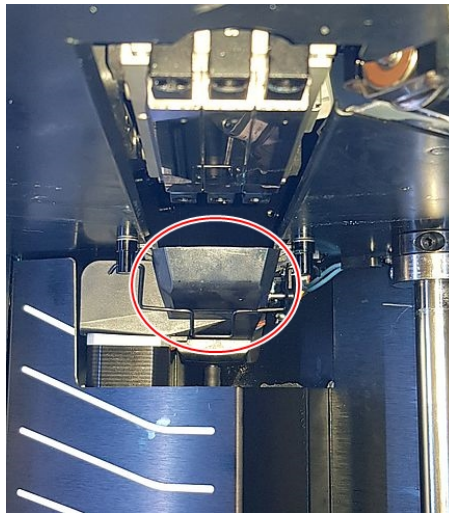


Figure 4-46 Purge unit

- b. Pull the securing latch up and open the purge unit.

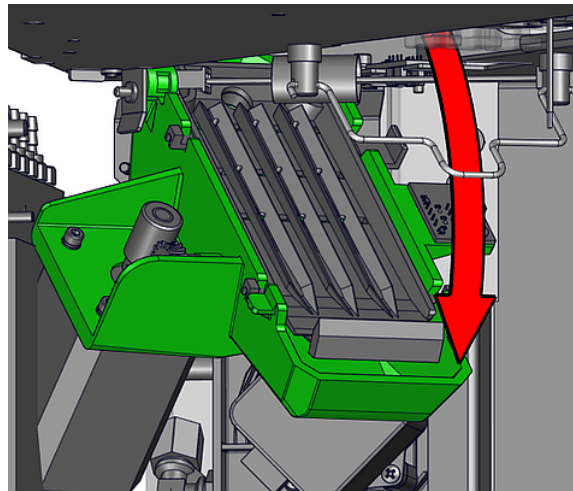
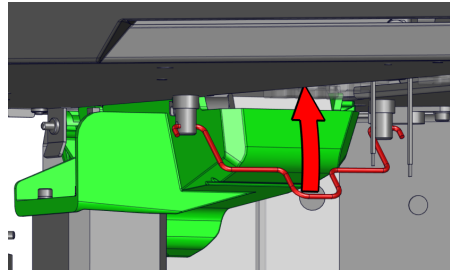


Figure 4-47 Opening the purge unit

10. With the alcohol-soaked cleaning cloth, clean the wiper and the surrounding area.  
Make sure to remove printing material from both sides of the wiper.  
If the wiper is scratched, torn or worn, or if you cannot clean it completely, you need to replace it. Do this with the [Wiper Replacement wizard](#) after completing this wizard.
11. Close the purge unit.
12. With the alcohol-soaked cleaning cloth, carefully clean the UV light.
13. Clean the build tray.
14. Select the confirmation check boxes in the wizard screen.
15. Remove the cleaning materials from the printer, and click **Next**.

16. In the next screen, you have the option to clean underneath the build tray.

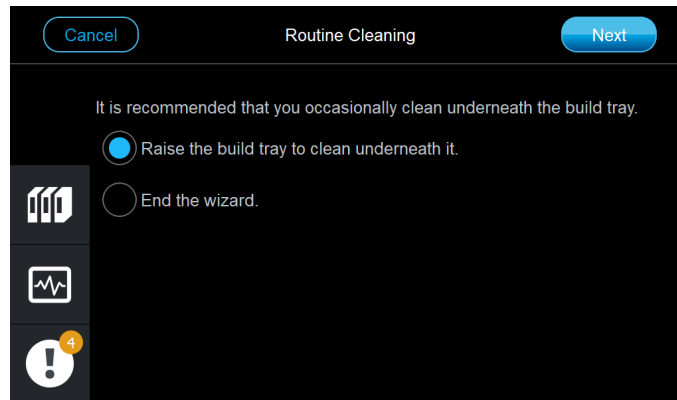


Figure 4-48 Additional cleaning option

If you choose to clean underneath the build tray, the tray is raised when you click **Next**.

## Pattern Test

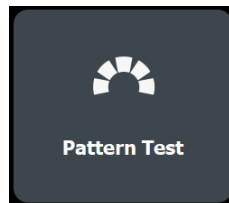
The pattern test is the basic verification of the printer's ability to produce quality models, since it demonstrates the condition of the nozzles in the print heads. Make sure, therefore, that you perform this test weekly, and whenever you suspect a printing problem.

### To perform the pattern test:

1. Prepare—
  - the Missing Nozzles ruler



- a sheet of pink paper (A-4 or Letter size)
2. Make sure that the build tray is empty.
  3. From the *Wizards* screen, select **Pattern Test**.



4. In the opening wizard screen, tap **Start** to begin.



- In the following screen, select **Print Pattern Test** and tap **Next**.

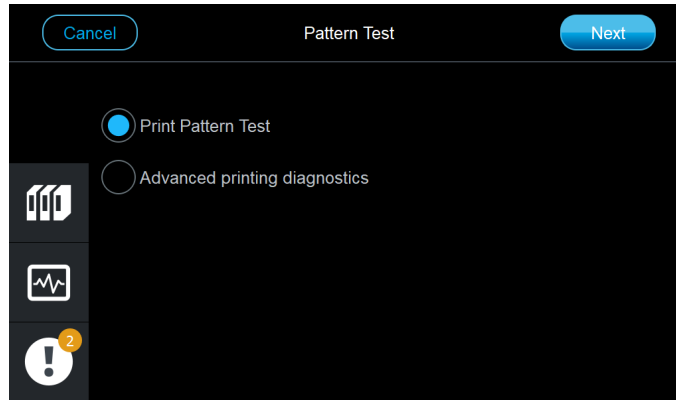


Figure 4-49 Pattern Test selection

**Note: Advanced printing diagnostics** includes operations for diagnosing possible faults in the print heads. Perform them only on the advice and direction of your Stratasys service provider.

- When the following screen appears, lock the build tray to prevent it from moving, and tape the test paper to the tray as shown.

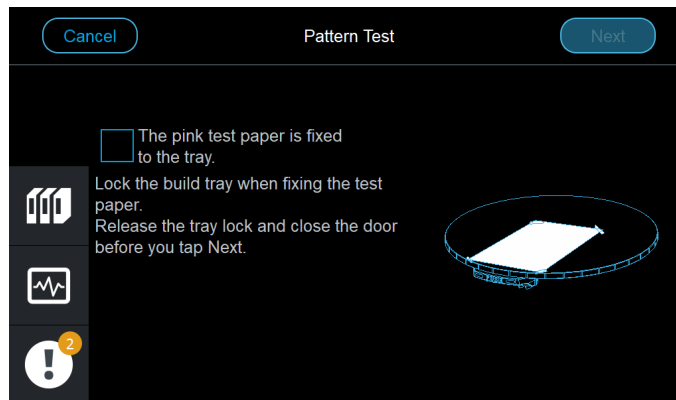


Figure 4-50 Preparing for the Pattern Test

- Release the build-tray lock and tap **Next**.  
Test patches are printed on the paper.
- When the following screen appears, remove the test paper and tap **Next**.

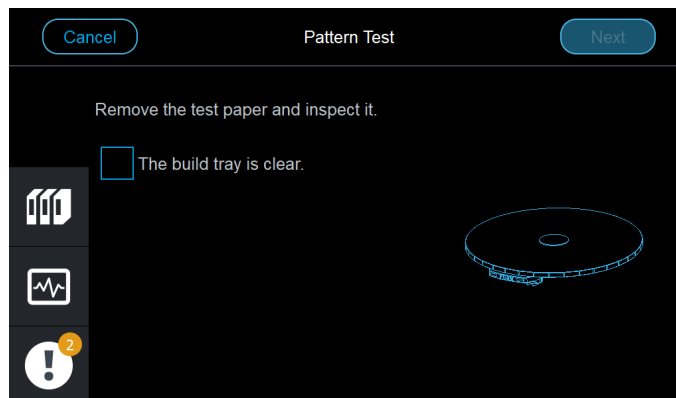


Figure 4-51 Pattern Test printing finished

9. Inspect the test paper to see if there are missing lines in the printed patches, which indicate clogged nozzles in the print head.



Figure 4-52 Missing line in the test print

10. Use the Missing Nozzles ruler to determine the number of clogged (“missing”) nozzles. The number on the ruler indicates the number of missing rows/nozzles.
11. In the following screen, record the number of missing nozzles for each print head, then tap **Next**.

Pattern Test

Inspect the test paper. Gaps in the printing indicate clogged nozzles.

1. Enter the number of missing nozzles for each print head.
2. Verify that the color shown for each head matches the color of the respective material cartridge.

	Patch 1	Patch 2	Patch 3	Patch 4	Patch 5	Patch 6
Missing nozzles	0	0	0	0	0	0
Matching color	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Figure 4-53 Recording test results

**Note:** The check boxes under "Matching color" are selected by default. Unless you just replaced the print heads, there is no need to verify the material colors.

The next screen allows you to print another series of test patches and enter the results.

If there are many clogged nozzles, the wizard suggests that you clean the print heads with the Routine Cleaning wizard, and test again.

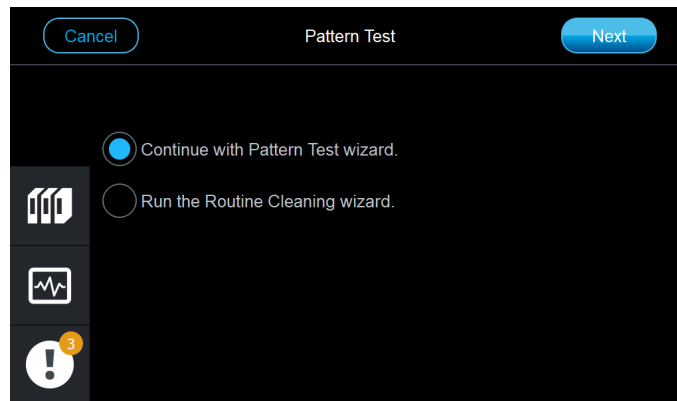


Figure 4-54 Selecting how to continue

**Note:** Acceptable model quality is subjective, and depends on the type and scale (size) of the models produced. However, too many missing lines, especially if they are in the same area, indicates that the quality of printed models will be poor.

## Replacing the Wiper

To prevent clogging of the material channels and nozzles in print heads, they are regularly flushed during printer operation and maintenance. (This is the Head Purging process.) The wiper then removes excess material from the print heads. Its condition affects its ability to do so effectively, which, in turn, affects the quality of printed models. For this reason, you clean and inspect the wiper daily with the [Routine Cleaning wizard](#). The wiper should be replaced, proactively, every 650 wipes, or every 4 months.

After replacement, the wizard adjusts the wiper so that it wipes excess material from the print heads effectively. The entire process takes about 30 minutes.

To replace the wiper:

1. Prepare disposable cleaning gloves.
2. From the *Wizards* screen, select **Wiper Replacement**.



Figure 4-55 Wiper Replacement button

3. Start the wizard, and follow the instructions.

The wizard moves printer components for easy access to the purge unit, where the wiper is located.

4. When you open the printer, locate the purge unit, in the rear-left corner, behind the print heads.



Figure 4-56 Purge unit

5. Put on the gloves.



### Caution

Uncured printing material on printer components might cause skin irritation. Use disposable cleaning gloves to protect your hands.

6. Pull the securing latch up to open the purge unit.

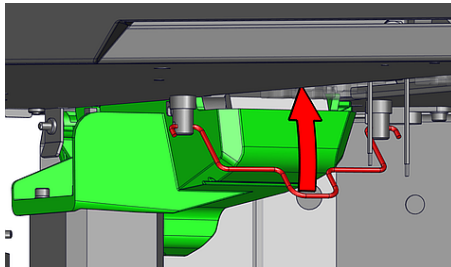


Figure 4-57 Releasing the purge-unit latch

- Pull the purge unit down to open it.

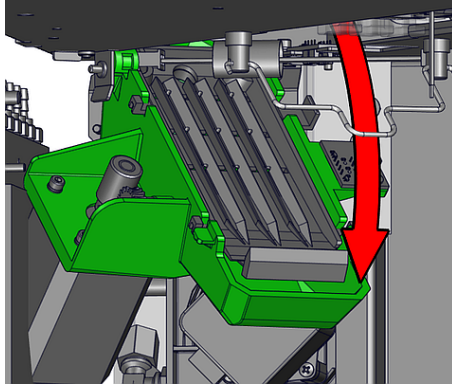


Figure 4-58 Opening the purge unit

- Lift and remove the waste collector.

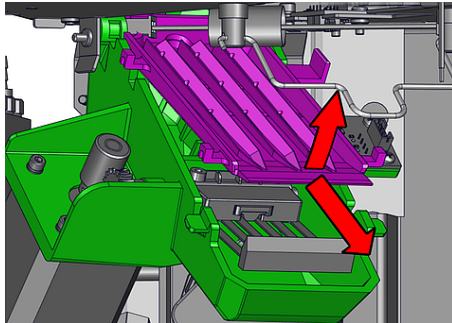


Figure 4-59 Removing the purge-unit waste collector

- Close the printer door, select the confirmation check boxes in the wizard screen, and tap **Next**.

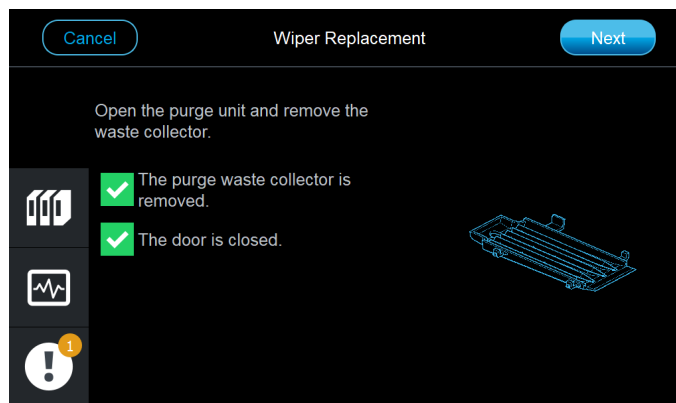


Figure 4-60 Removing the purge-unit waste collector

The printer moves the wiper into position for easy removal.

10. When the following screen appears, grasp the wiper and pull it out.

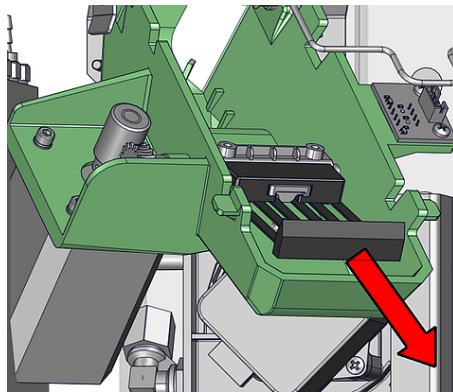
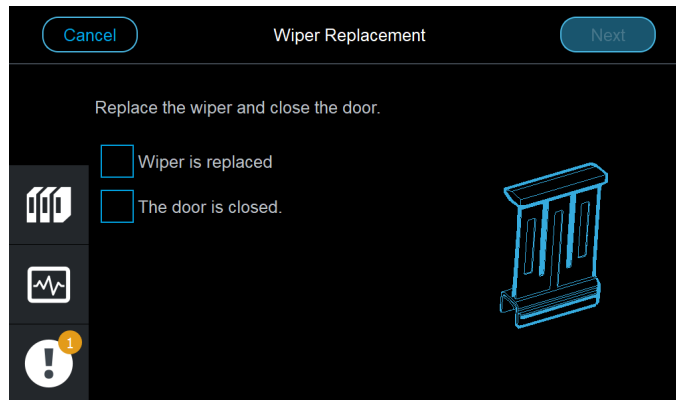


Figure 4-61 Removing the wiper

11. Install a new wiper, and confirm this in the wizard screen.

**Important:** The new wiper clicks into place. Make sure that it is firmly inserted.

12. When the following screen appears, return the waste collector to the purge unit, close the purge unit and lock it with the securing latch.

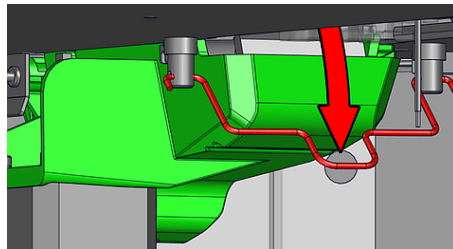
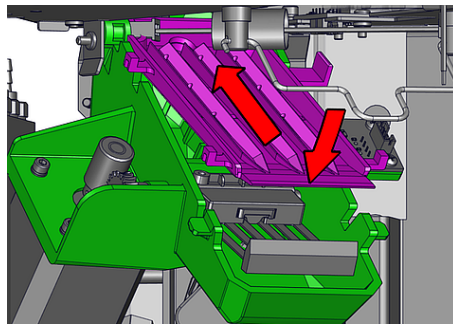
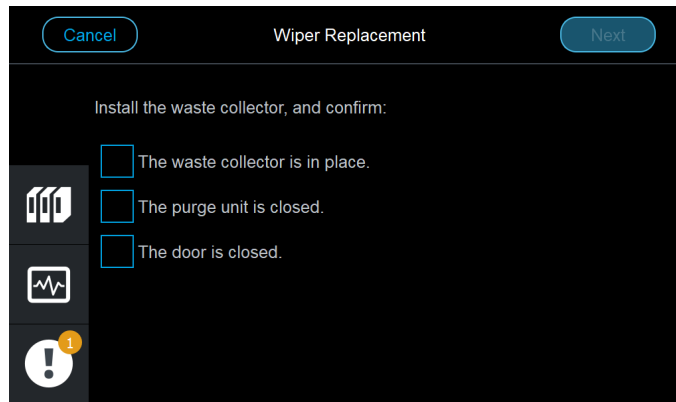


Figure 4-62 Installing the waste collector and closing the purge unit

13. Select the confirmation check boxes in the wizard screen, and tap **Next**.

After replacing the wiper, you determine if it needs to be adjusted to wipe the print heads effectively. You do this by looking to see if there is a gap between the print heads and the wiper, and indicating this in the wizard screen.

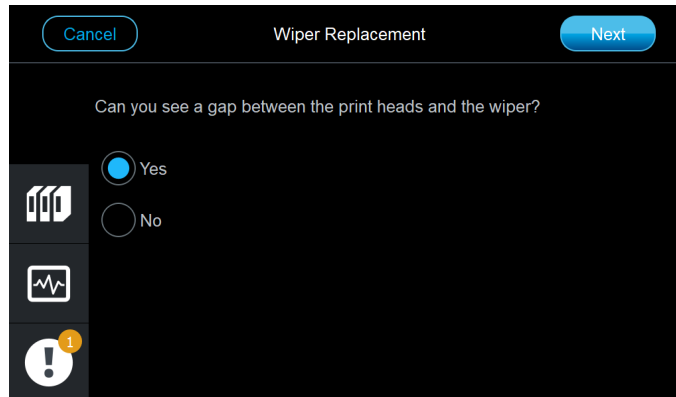


Figure 4-63 Wiper adjustment selection

14. Follow the remaining wizard screens to complete the procedure.

## Replacing the Roller Waste Collector

A maintenance reminder appears when you need to replace the roller waste collector. Replacement is necessary after 500 hours of printing or 4 months. You should replace the unit earlier if it does not effectively keep the roller clean.

### To replace the roller waste collector:

1. Prepare—
  - a 3 mm hex (Allen) key
  - disposable cleaning gloves
  - 90% isopropanol (IPA—*isopropyl alcohol*) or ethanol (*ethyl alcohol*)
  - cleaning cloth



2. Open the printer and locate the roller waste collector, next to the roller.

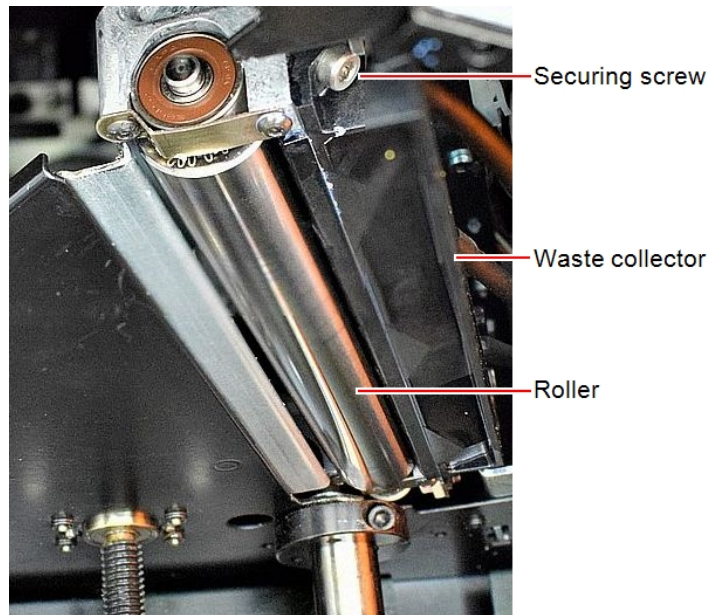


Figure 4-64 Roller and waste collector

3. With the 3-mm hex (Allen) key, **loosen** (do not remove) the screws securing the roller waste collector.

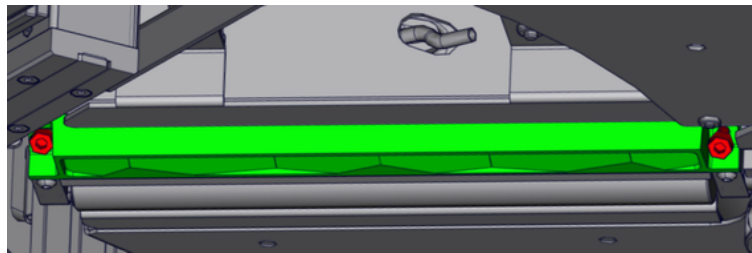


Figure 4-65 Roller waste collector and securing screws

4. Pull the waste collector down to remove it,



**Warning:**

The scraper blade in the roller waste collector is sharp.  
Use caution when handling the unit.

5. Soak a cleaning cloth with IPA (isopropyl alcohol) and clean the roller.
6. Install the new roller waste collector.

**After replacing the waste collector in the printer, reset the maintenance reminder in the software:**

1. From the *Wizards* screen, select **Preventive Maintenance**.
2. In the opening wizard screen, click **Start** to begin.
3. In the next screen, select **Roller Waste Collector**.
4. In the following screen, select the confirmation check box.

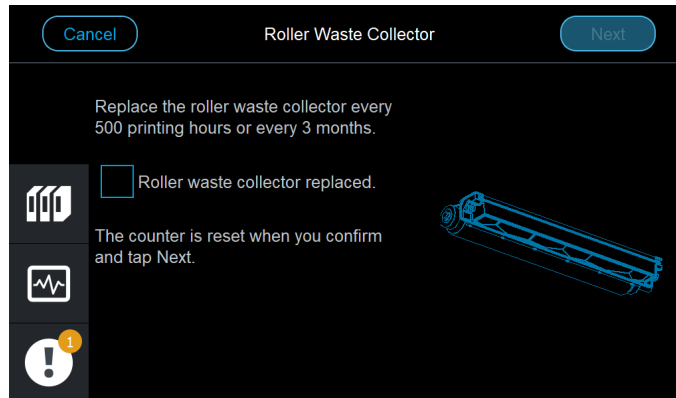


Figure 4-66 Replacement confirmation

## Optimizing Print Heads

The condition of the print heads directly affects the quality of printed models. To maintain optimum printing, you should routinely test the print heads, and adjust them to the best working configuration possible by running the Head Optimization wizard every 300 hours of printing, after replacing printing materials with materials of another type and if you suspect that there is a problem with one or more of the print heads.



After replacing cleaning fluid with printing materials, running the Head Optimization wizard is required before printing.

If, during the optimization process, the wizard determines that a print head is faulty—or that it is negatively affecting layer uniformity with the current head configuration—the wizard instructs you to replace it. If this happens, you can continue the wizard to replace the print head, or abort the wizard, to replace the head at another time.

This procedure takes 30–50 minutes.

**Note:** To accurately test and optimize print heads, they must be clean. If necessary, run the Routine Cleaning wizard before beginning this procedure.

### To test and optimize the print heads:

#### 1. Prepare—

- disposable cleaning gloves (any clean, powder-free protective gloves)
- 90% isopropanol (IPA—*isopropyl alcohol*) or ethanol (*ethyl alcohol*)
- supplied cleaning cloths or equivalent
- the Missing Nozzles ruler



- WTC600/POU scale (supplied for use in the Advanced Head Optimization wizard)

**Important:** Before beginning this procedure, make sure that the scale is calibrated and level. Refer to the instructions supplied with the scale.

#### 2. Tap the Tools button.

#### 3. From the *Wizards* screen, tap **Advanced Head Optimization**.

#### 4. In the opening wizard screen, tap **Start** to begin.

#### 5. Continue as follows:

- If you have recently cleaned the print heads, tap **Continue with head optimization**.
- Otherwise, tap **Run the Routine Cleaning wizard**. The Routine Cleaning wizard starts. Perform the wizard and clean the printer parts (see "Routine Cleaning" on page 4-33).

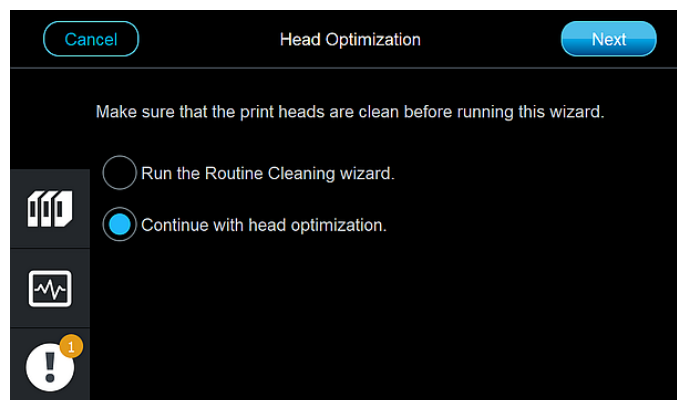


Figure 4-67 Clean print heads confirmation

When done, the Advanced Head Optimization wizard continues.

To determine the condition of the print heads, the printer prints a Pattern Test.

6. Open the printer door, and tape a sheet of pink paper to the build tray.

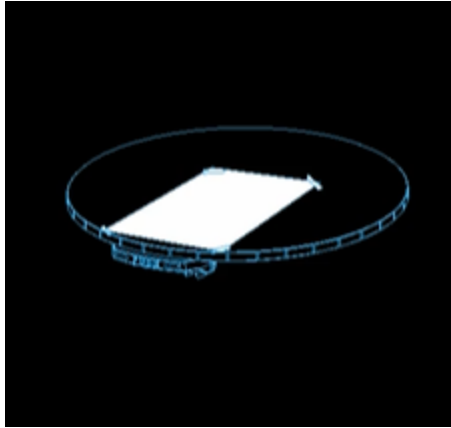


Figure 4-68 Placement of pink paper on the build tray

7. Confirm that the pink paper is fixed to the tray, close the printer door and tap **Next**.  
A Pattern Test is printed on the sheet.

8. When the Pattern Test is completed, remove the sheet from the printer.
9. Make sure that the build tray is clear and close the print door and tap **Next**.
10. Inspect the test paper for missing line, which indicate clogged nozzles.



Figure 4-69 Test print on the pink paper

11. In the following screen, enter the number of missing nozzles for each print head, then tap **Next**.

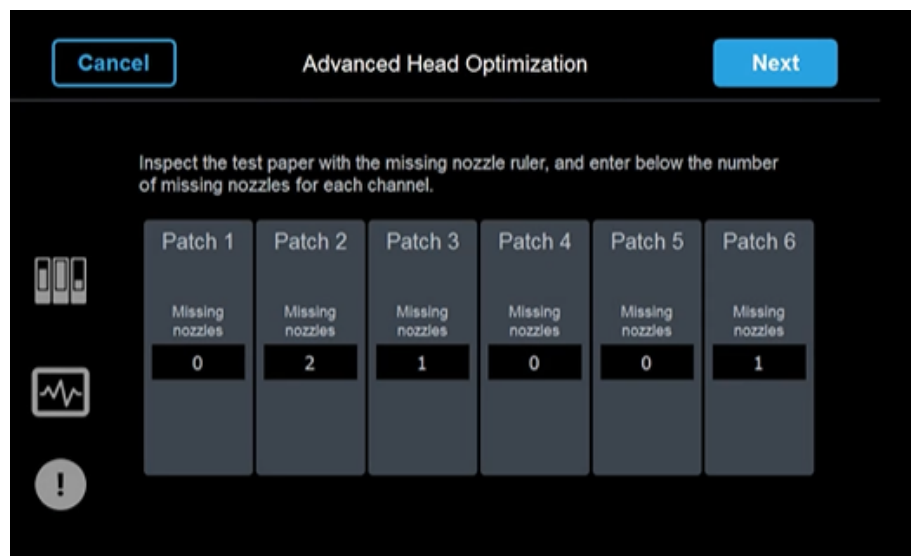


Figure 4-70 Recording test results

12. Continue as follows:
  - If the number of missing (clogged) nozzles is not acceptable, follow the instructions in the wizard.
  - If the number of missing (clogged) nozzles is acceptable, the printer continues to print-head optimization and prints a frame on the build tray for positioning the scale.
13. Place the scale on the build tray within the frame.
14. Follow the instructions in the wizard to set up the scale in the printer.
15. Place the resin container on the scale.
16. Verify that the print heads are exactly above the resin container and tap **Next**.

Printing material (resin) is jetted from each head and its weight is automatically recorded.

17. When done, remove the resin container from the printer.
18. Empty the resin into the waste container. Remove the container from the material cabinet so that you have access to the cap. Open the cap and carefully pour the liquid resin into the waste container. Close the cap and return the container to the cabinet.



Figure 4-71 Emptying the resin container

19. Remove the scale and its cable from the printer.
20. Place the resin container on the build tray within the frame to cure the remaining excess resin and tap **Next**.
21. When done, remove the resin container from the printer.
 

**Note:** You can re-use the resin container several times.
22. Using a scraper, remove the printed frame from the build tray.
23. Wet a wiping cloth with isopropanol and clean the build tray.
24. Confirm in the wizard and tap **Next**.
25. In the results screen, tap **Next** to complete the wizard.

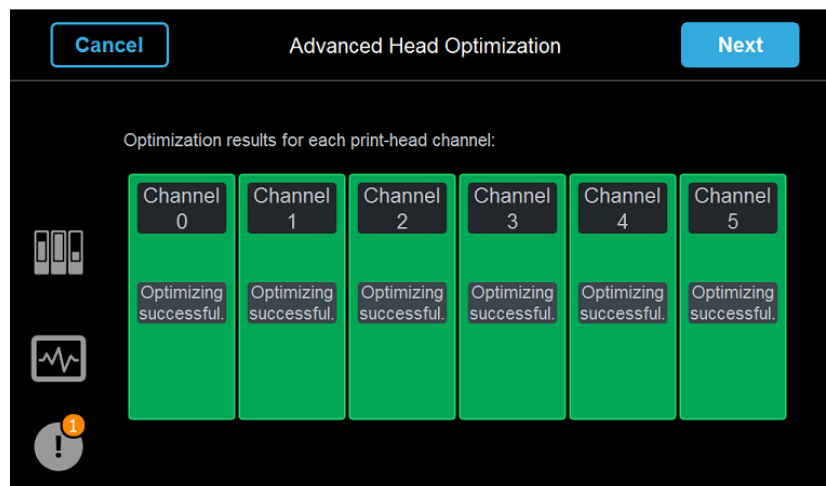











Figure 4-72 Head optimization results

### Troubleshooting a Scale Connectivity Error for the WTC600/POU Scale:

If you experience a Scale Connectivity Error, verify that the scale is connected to the USB cable, and then configure the scale, as follows:

1. Press  and  to access the main menu.
2. Press  a few times until *P5.ducE* is displayed.
3. Press . *5.1.PC* is displayed.
4. Press  until *5.1.1.Prt* is displayed.
5. Press . *r51* is displayed.
6. Press  until *USbb* is displayed.
7. Press .
8. Press  a few times until you return to the main screen.

## Replacing Print Heads

The condition of the print heads directly affects the quality of printed models. You may need to replace a print head if one or more of the following symptoms occurs:

- The Head Optimization wizard determines that a print head could not be adequately adjusted. (See "Optimizing Print Heads" on page 4-48.)
- There are noticeable grooves in the surface of printed models.
- The [Pattern Test](#) reveals that there are many clogged nozzles, even after trying to unclog them.
- Visual inspection of the head reveals that its surface is damaged—peeling or bubbles in the nozzle area.



Replace print heads only after consulting with an authorized Stratasys service provider.

The **Head Replacement wizard** guides you through the procedure of replacing a print head, and configures printer components to enable you to perform it. Replace a print head only with the wizard.

The entire print-head replacement procedure takes 90 minutes, and consists of the following phases:

- A. Identifying the head(s) needing replacement.  
This is normally done by the Head Optimization wizard or the [Pattern Test](#). Otherwise, evidence of physical damage to the head surface indicates which head needs replacing.
- B. Preparing the print block for head replacement.  
This is done automatically when you run the wizard.
- C. [Removing the defective print head.](#)
- D. [Installing a new print head.](#)
- E. [Optimizing print-head functioning \(with the Head Optimization wizard\).](#)
- F. [Aligning the print heads \(with the Head Calibration wizard\).](#)

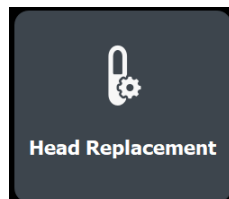
### To replace a print head:

1. Prepare—
  - replacement print head(s)
  - print-head extractor
  - print-head-driver installation tool
  - 90% isopropanol (IPA—*isopropyl alcohol*) or ethanol (*ethyl alcohol*)
  - disposable cleaning gloves (use clean, powder-free gloves)
  - lint-free cleaning cloths
  - 2.5-mm hex (Allen) key (supplied in the start-up kit)



Replacing print heads is a long procedure. The complete procedure includes a series of tests and calibration tasks to verify that the heads are installed properly and that print quality is optimum.

2. From the *Wizards* screen, select **Head Replacement**.



3. In the opening wizard screen, tap **Start** to begin.



- When the following screen appears, select an option for each of the print heads.

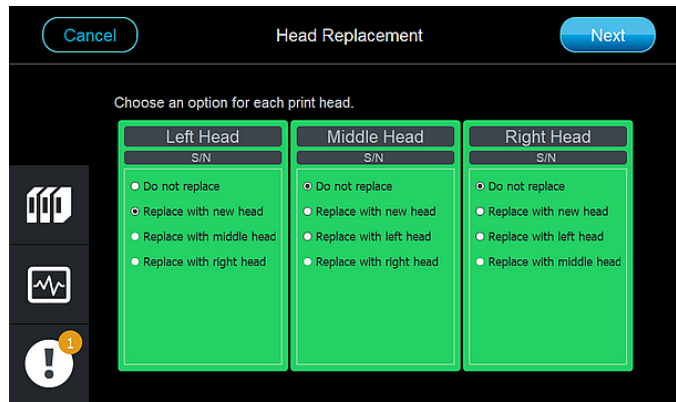


Figure 4-73 Print-head replacement options

When you tap **Next**, the wizard prepares the heads by heating them and emptying the printing material. This can take up to 15 minutes.

When the heads cool down, the following screen appears.

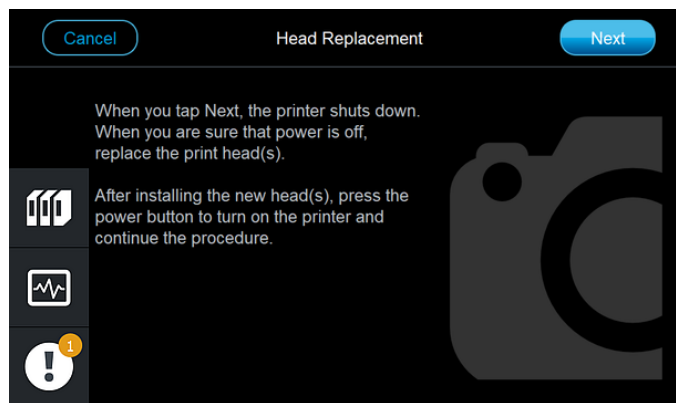


Figure 4-74 Head replacement preparation

- Tap **Next** to prepare the printer for shutdown.
- After the interface screen goes blank, turn off the power switch at the back of the printer.
- Disconnect the power cable for additional safety.

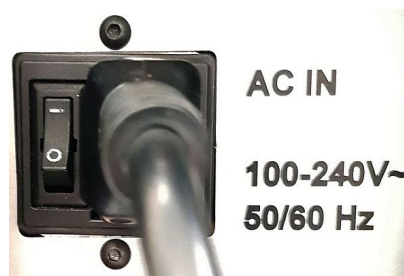


Figure 4-75 Main power switch and cable

## Removing the Defective Head

1. Open the door and clean the print heads with the cleaning cloth and alcohol.



### Warning: Electrical Hazard

Contact with live circuits could cause serious electric shock. Do not continue before turning off the power switch and disconnecting the power cable.

2. Place a clean cloth on the build tray under the print heads.
3. Remove the two screws securing the top cover, and remove the cover.



Figure 4-76 Removing the top cover

4. Locate the print block assembly.

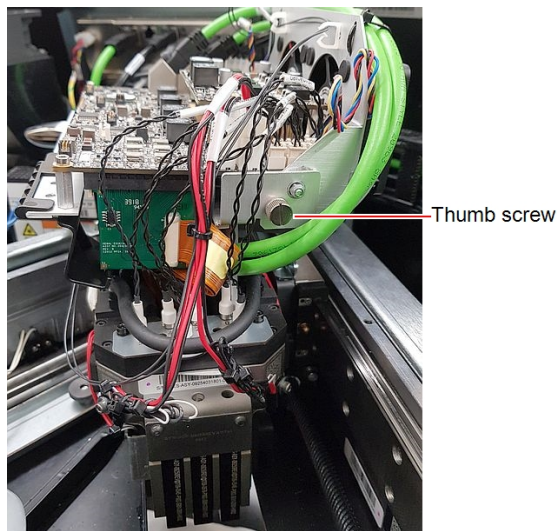


Figure 4-77 Print block assembly with electronics

5. Loosen the thumb screws on both sides of the electronics assembly.
6. Raise the side of the electronics assembly, as shown, to allow access to the print-head driver cards.

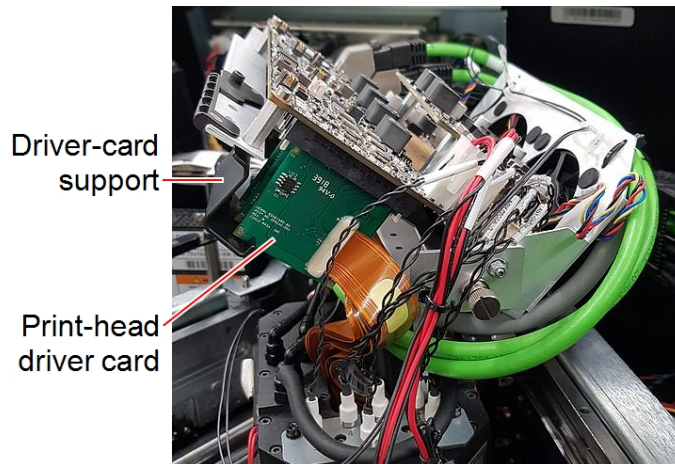


Figure 4-78 Electronics assembly in raised position

7. Move the bracket supporting the head driver cards from under them, and slide it out.

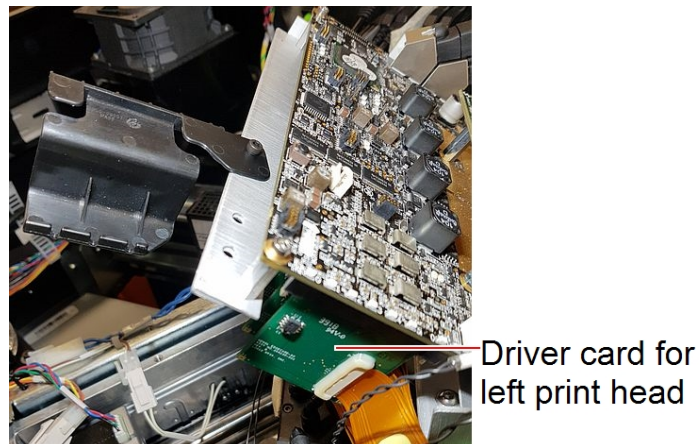


Figure 4-79 Removing the support bracket from the driver-cards

8. Locate the driver card for the print head needing replacement.

The card closest to the back of the printer belongs to the **left** print head (M1).

9. Release the latches that secure the print-head driver card.



Figure 4-80 Releasing the print-head driver card

10. Remove the driver card from its holder.
11. From inside the printing chamber, loosen the securing screws on both sides of the print head.

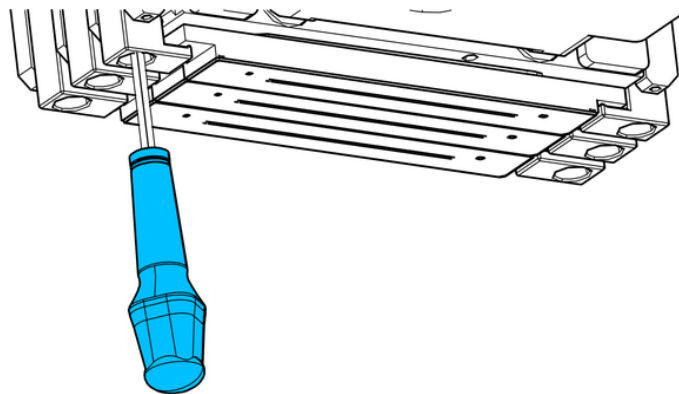


Figure 4-81 Loosening the print-head securing screws

After loosening the securing screws, the print head descends.

12. On both sides of the print head, move the securing brackets outwards to free the head.

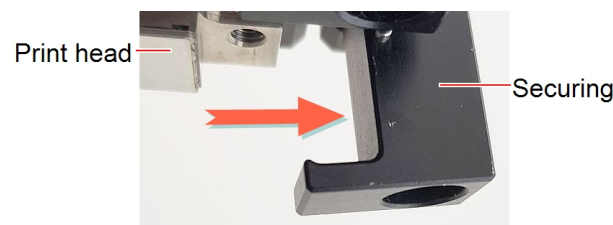


Figure 4-82 Releasing the print-head



13. If the print head does not descend, or if you cannot remove it from the print block easily, attach the print-head extractor to the head with the screws, and pull down.

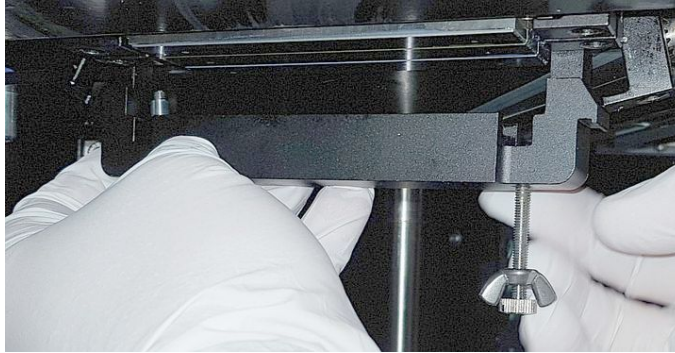


Figure 4-83 Attaching the print-head extractor

14. While holding the print head with one hand, guide the driver card through the opening and remove the head from the printer.
15. Make sure that along with the head, you remove the four (4) rubber O-ring seals.

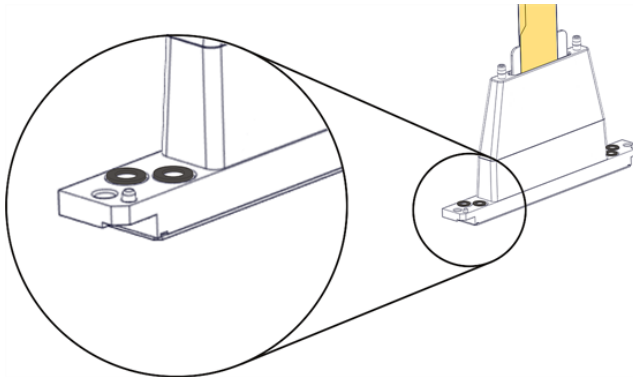


Figure 4-84 O-ring seals on the print head



### Important

If the seals are not removed with the head, they are probably stuck to the print block housing. If so, remove them.

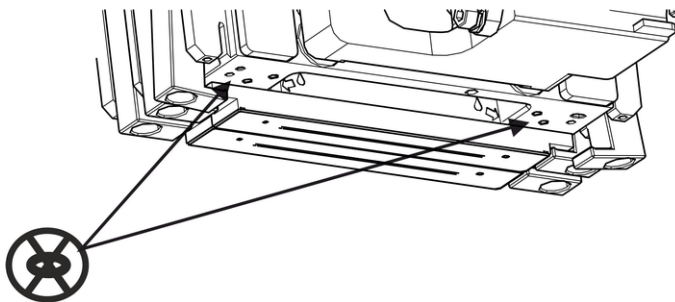


Figure 4-85 Making sure the O-rings are not stuck to the print block

## Installing the New Head

16. Place four (4) **new** O-ring seals in the replacement head (see Figure 4-84 on the previous page).
17. Place a cleaning cloth on the build tray and place the head on it, as shown below.

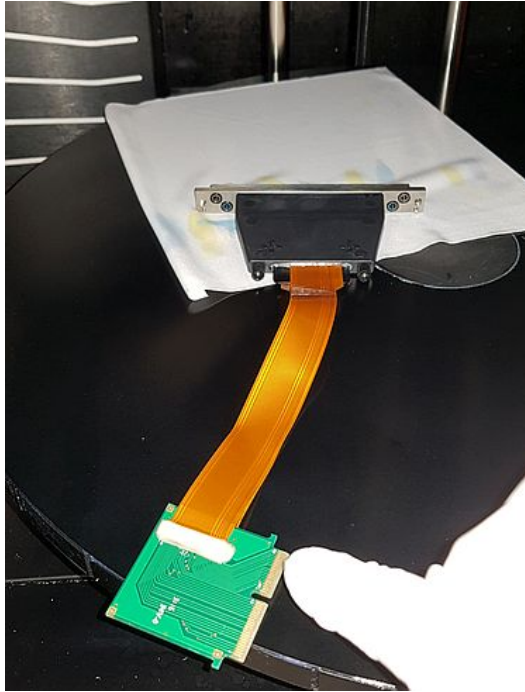


Figure 4-86 New print head before installation

18. Take the print-head-driver installation tool and insert it, from above, through the opening in the eprint block.

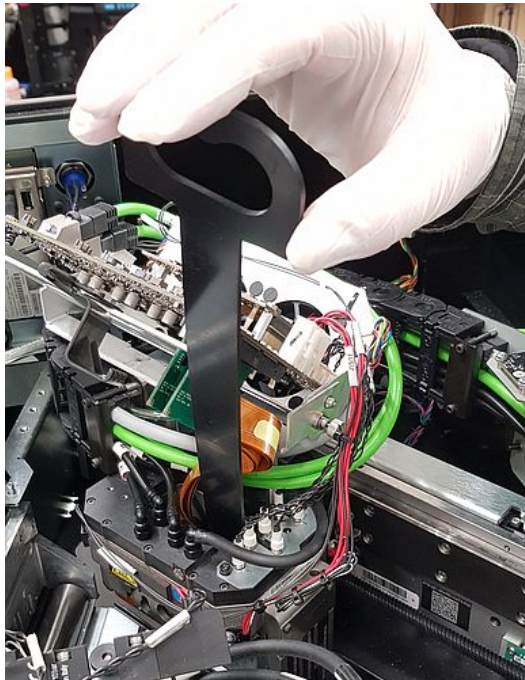


Figure 4-87 Inserting the print-head-driver installation tool

19. Inside the printing chamber, attach the driver card to the installation tool with the elastic band.

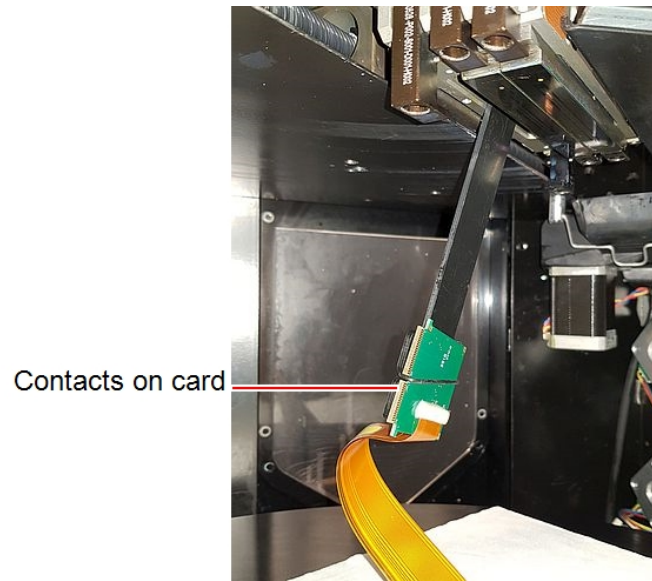


Figure 4-88 Inserting the print-head-driver installation tool

**Important:** To install the print head correctly, the contacts on the driver card should face you as you attach it to the installation tool.

20. While holding the print head with one hand, pull the installation tool up until the driver card passes through the opening.  
Keep the driver card attached to the installation tool.

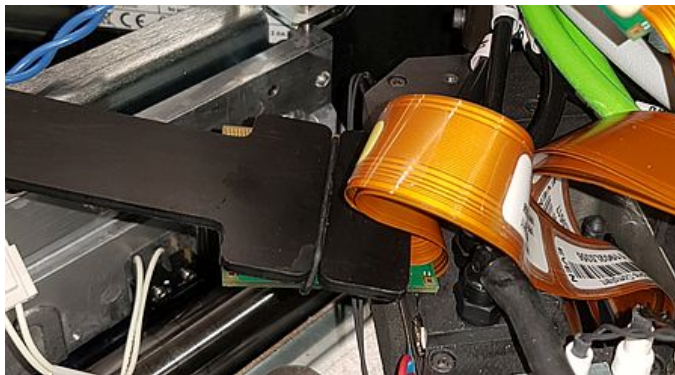


Figure 4-89 Inserting the print-head-driver installation tool

21. In the printing chamber, place the securing brackets under the print head, then raise the head into place.

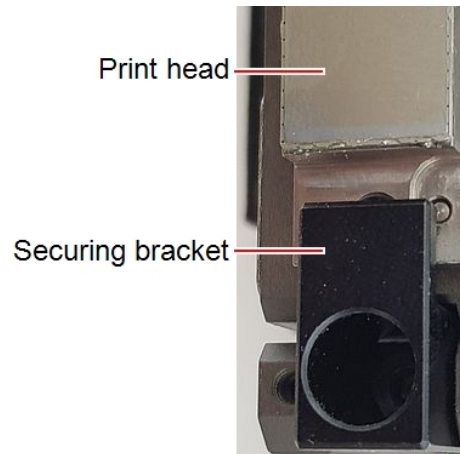


Figure 4-90 Positioning the bracket under the print head

22. Tighten the securing screws on both sides of the print head.

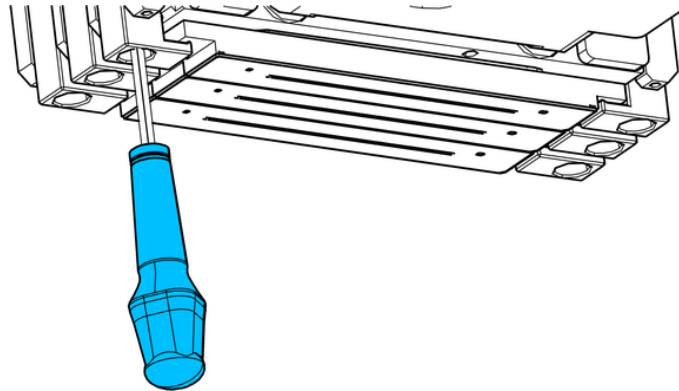


Figure 4-91 Securing the print head to the print block

**Important:**

Make sure not to tighten the securing screws more than necessary. Be careful not to damage the surface (orifice plate) of the print head.



23. Detach the driver card from the installation tool, and install it. Secure it with the latches.

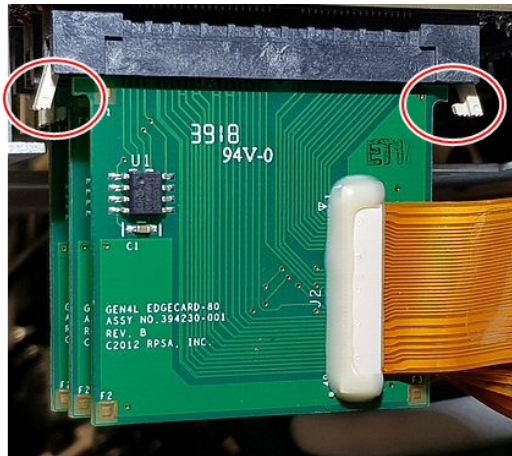


Figure 4-92 Installing the print-head driver card

24. Move the supporting bracket back into place, under the driver cards, and make sure that all of the cards are secure in the circuit board.

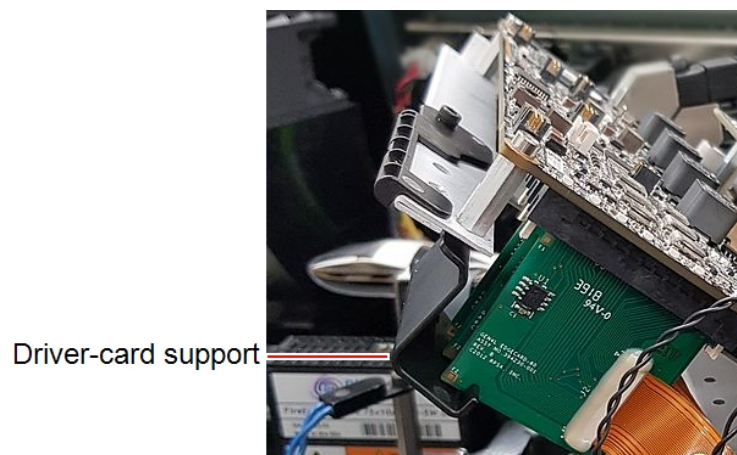


Figure 4-93 Bracket supporting the driver-cards

25. Lower the electronics assembly and tighten the thumb screws to secure it.  
26. Attach the printer cover.

**After replacing the print head(s), continue as follows:**

1. At the back of the printer, connect the power cable and turn on the main switch.
2. At the front of the printer, press the printer power button to turn on the printer.



Figure 4-94 Power button

When the printer computer restarts, you need to open the Head Replacement wizard to complete the procedure. The alert *Head replacement incomplete* appears in the *Alerts* list.

3. Open and start the Head Replacement wizard. When the following screen is displayed, tap **Next**.

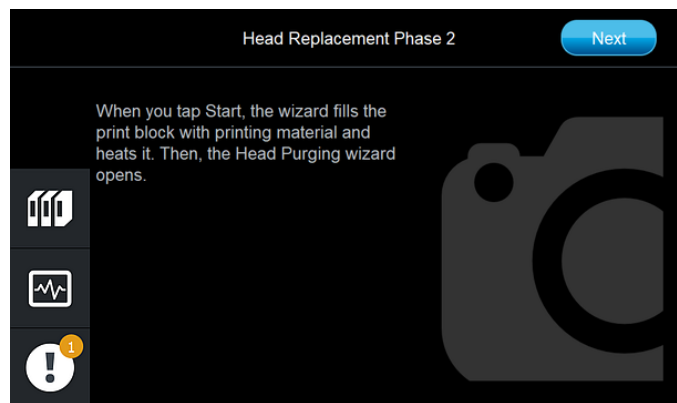


Figure 4-95 Head Replacement Phase 2

The wizard fills the heads with printing material. Then, additional wizards allow you to check that the heads are installed properly and that print quality is optimum.

The following wizards open automatically.

- Head Purging wizard—to force material through nozzles to ensure that they are not clogged, and that the wiper is calibrated
  - [Pattern Test](#)—to verify that the heads can print properly, through all nozzles
4. If the results of the Pattern Test are satisfactory, run the following wizards to calibrate the printer for optimum print quality:
    - [Head Optimization wizard](#)—to adjust the heads for optimum printing
    - [Head Calibration wizard](#)—to improve printing accuracy

## Checking Printing Accuracy

If there are printing-accuracy issues, as explained below, you can check if the printing process (in the printer software) is aligned to match the exact position of the print heads installed. With the Printing Accuracy Validation wizard, you can determine if you need to run the [Head Calibration wizard](#).

Indications of misaligned print heads are lack of color consistency, jagged lines and other flaws in printed models.



Printed models with sections that are missing usually indicate clogged nozzles in heads, or heads that are not functioning well together. If this is the case, you need to run the [Head Optimization wizard](#).

### To check printing-accuracy:

1. Prepare a sheet of pink test paper.
2. From the *Wizards* screen, select **Printing Accuracy Validation**.



3. In the opening wizard screen, click **Start** to begin.
4. When the following screen appears, lock the build tray to prevent it from moving, and tape the test paper to the tray as shown.

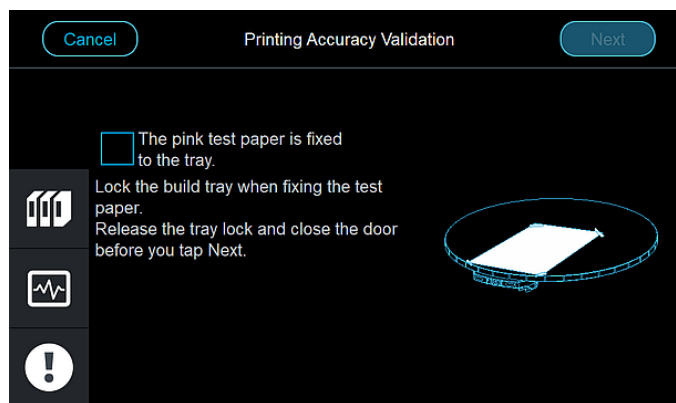


Figure 4-96 Preparing for the printing accuracy check

5. Release the build-tray lock and tap **Next**.

- When the following screen appears, open the printer and remove the test paper.

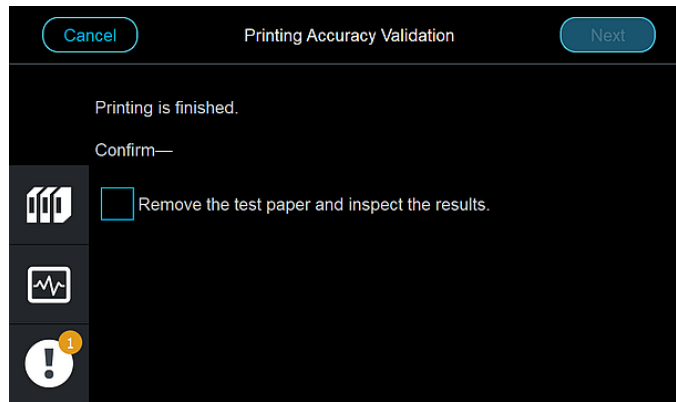


Figure 4-97 Test printing finished

When you select the confirmation check box and tap **Next**, the wizard ends.

- Carefully inspect the test paper.

Calibration is necessary if you can see that patches printed by different heads are not aligned.

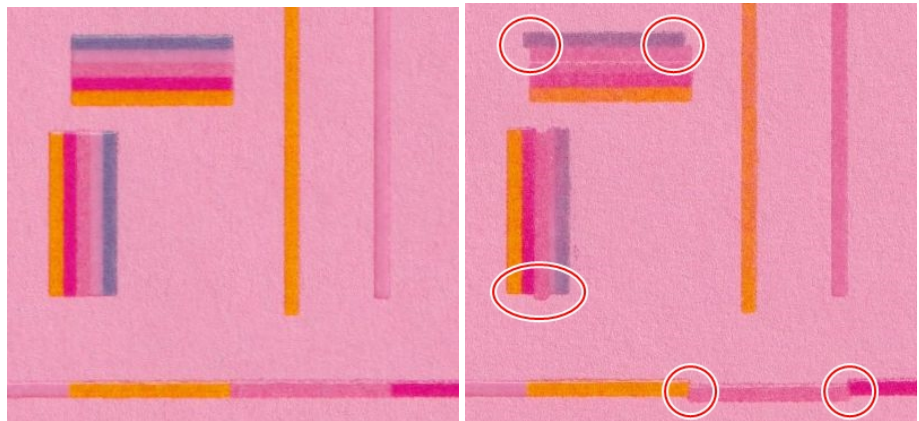


Figure 4-98 **Left:** Calibrated heads **Right:** Heads needing calibration

To calibrate head alignment, run the [Head Calibration wizard](#).

## Calibrating Print-Head Accuracy

To achieve optimum printing accuracy, the printing process (in the printer software) is aligned to match the exact position of the print heads installed. This is done with the aid of the Head Calibration wizard and a scanner. After a transparency is printed and scanned, it is analyzed. Calibration parameters are then applied to the printer software, which are used when printing.



The calibration process described here does not replace the routine functional adjustment of print heads with the [Head Optimization wizard](#).

Perform this process—

- after replacing print heads.
- if the results of the [Printing Accuracy Validation wizard](#) indicate that calibration is necessary.

### To calibrate the print-head parameters:

#### 1. Prepare—

- disposable cleaning gloves (any clean, powder-free protective gloves)
- 90% isopropanol (IPA—*isopropyl alcohol*) or ethanol (*ethyl alcohol*)
- supplied cleaning cloths or equivalent
- the recommended scanner (supplied with the printer)
- a clean transparency (supplied in the Start-Up Kit)
- the grid transparency (supplied in the scanner accessories kit )
- a computer running GrabCAD Print (preferably, the computer that sends print jobs to the printer)

**Important:** The scanner platen and transparencies used in this procedure must be absolutely clean, without scratches, fingerprints or other marks. If necessary, use a suitable glass cleaner and cleaning cloth, and always wear gloves when handling these items.

### Printing a Transparency

#### 2. From the *Wizards* screen, select **Head Calibration**.



#### 3. In the opening wizard screen, click **Start** to begin.

4. In the following screen, select **Print transparency for analysis**.

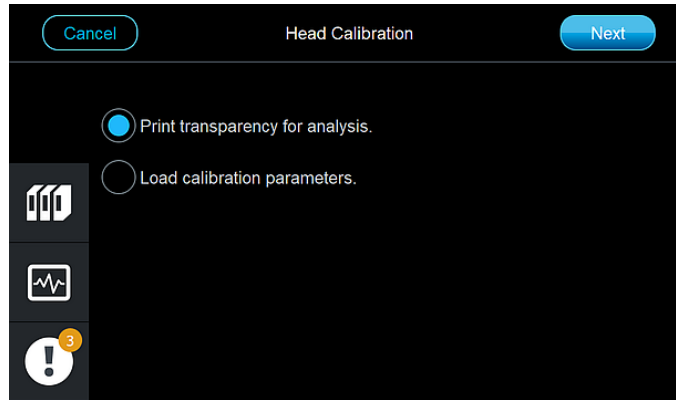


Figure 4-99 Wizard process selection

5. Make sure that the build tray is clear and clean, and confirm this in the wizard screen.

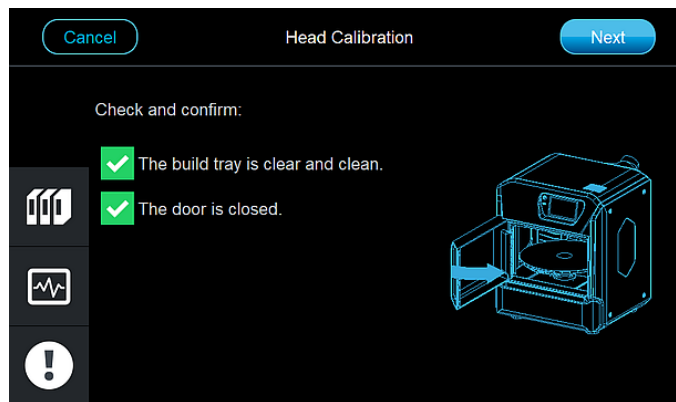


Figure 4-100 Preparing for head calibration

When you tap **Next**, a frame is printed in the center of the build tray.

6. When the following screen appears, open the printer and remove the cap from the center of the build tray (see below). Then, place the blank transparency sheet in the printed frame, and secure it with tape.

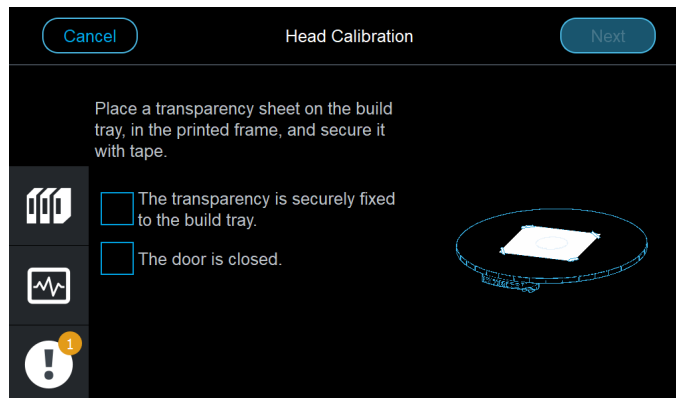


Figure 4-101 Fixing the transparency to the tray

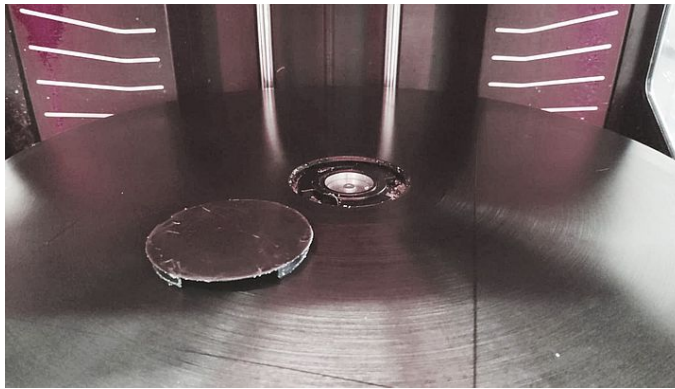


Figure 4-102 Build tray cap removed

7. Confirm the items in the wizard screen, and tap **Next**.

A test pattern is printed on the transparency. This completes the first part of the calibration process.

### Scanning the Transparencies

After printing the test pattern on a transparency, you scan it. In addition, you scan the reference (grid) transparency.

The illustrations in this section show the Canon CanoScan LiDE 400 interface.

If you need to install the software for this scanner, download it from:

[https://www.canon.co.uk/support/consumer\\_products/products/scanners/lide-series/canoscan-lide-400.html?type=drivers&language=&os=windows%2010%20\(64-bit\)](https://www.canon.co.uk/support/consumer_products/products/scanners/lide-series/canoscan-lide-400.html?type=drivers&language=&os=windows%2010%20(64-bit))

Use the scanner supplied with your printer or the one currently recommended by Stratasys.

For convenience, the scanner should be connected to the computer running GrabCAD Print.

#### To scan the transparencies:

1. On the GrabCAD client connected to the scanner, open the scanning application.

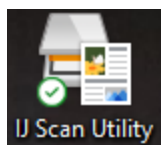


Figure 4-103 Scanner icon

2. In the opening screen, select **ScanGear**.

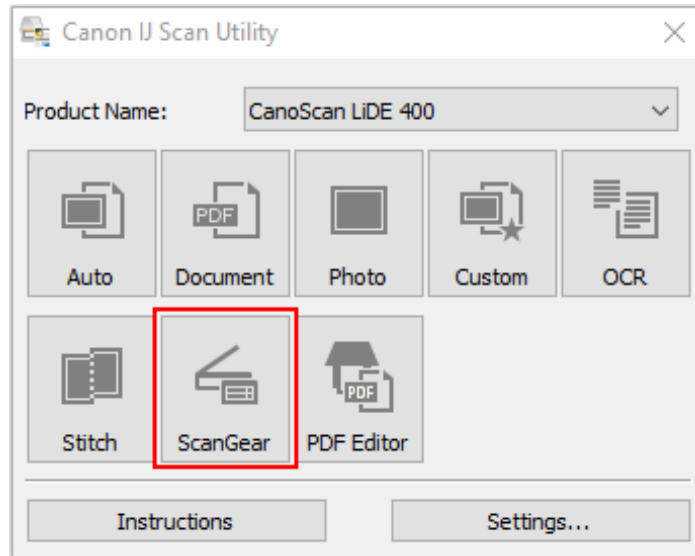


Figure 4-104 Scanning selection



- In the *Advanced Mode* tab, open the *Favorite Settings* menu, and select the printer model.

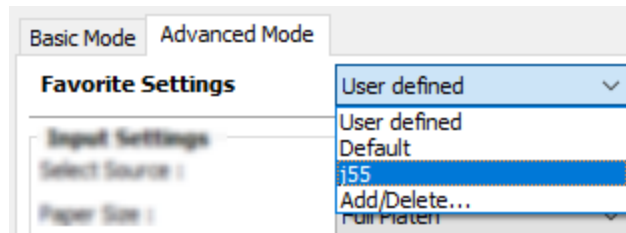


Figure 4-105 Favorite Settings selection (sample)

- Make sure that these settings are as follows:

- Output resolution: **1200** dpi
- Image Adjustment: **None**
- Unsharp Mask: **OFF**

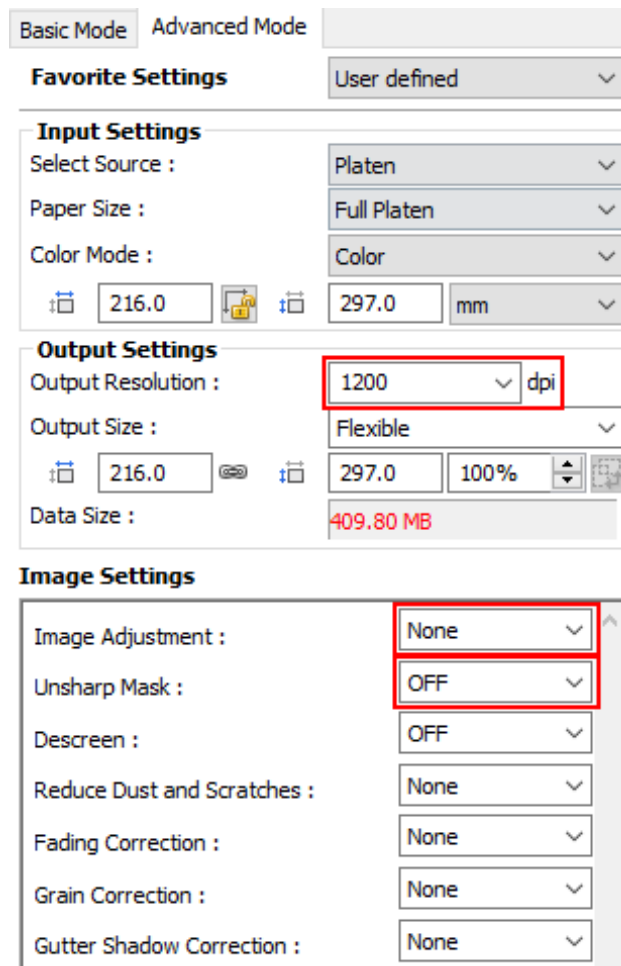


Figure 4-106 Advanced Mode settings

- Place the test-pattern transparency face-up on the scanner platen, so that the arrow on the transparency is near the arrow on the scanner (in the lower-left corner).  
Make sure that the bottom and left edges of the transparency are at the borders of the platen.



Figure 4-107 Placing the transparency on the scanner

- At the bottom of the scanner interface, click **Preview**.

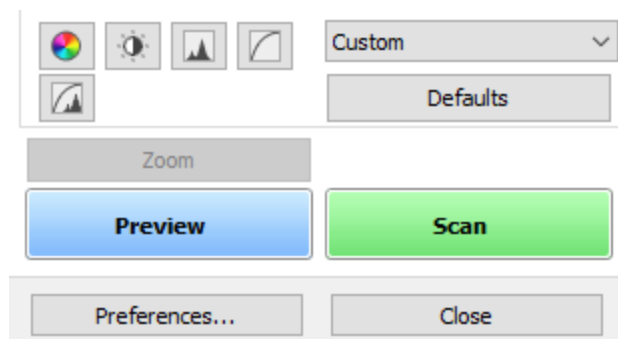


Figure 4-108 Scanner interface, showing Preview and Scan buttons

- With the cursor, adjust the cropping frame (scan area) so that the area beyond the transparency is not scanned. Make sure that the entire area of the transparency is in the area to be scanned.



Figure 4-109 Adjusting the cropping frame (scan area)

- Click **Scan**.

- When scanning is finished, select **Scan other images** in the dialog box and click **OK**.

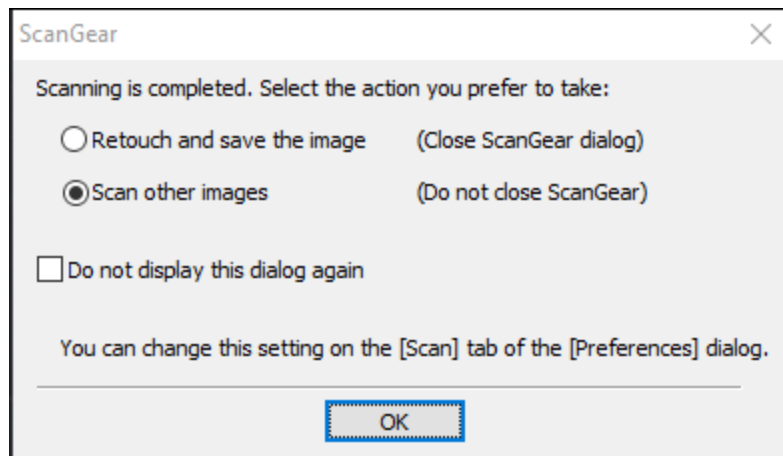


Figure 4-110 Selection after scanning the test pattern



If this dialog box does not appear, click **Preferences** (at the bottom of the interface) and in the *Scan* tab, select **Display the dialog to select next action**.

- Remove the transparency from the scanner, and place the reference (grid) transparency on the scanner platen, next to the bottom and left borders.
- Click **Scan**.  
**Note:** Do not adjust the cropping frame (scan area). The scanning size must remain the same as for the test-pattern scan.
- When scanning is finished, select **Retouch and save the image** in the dialog box and click **OK**.

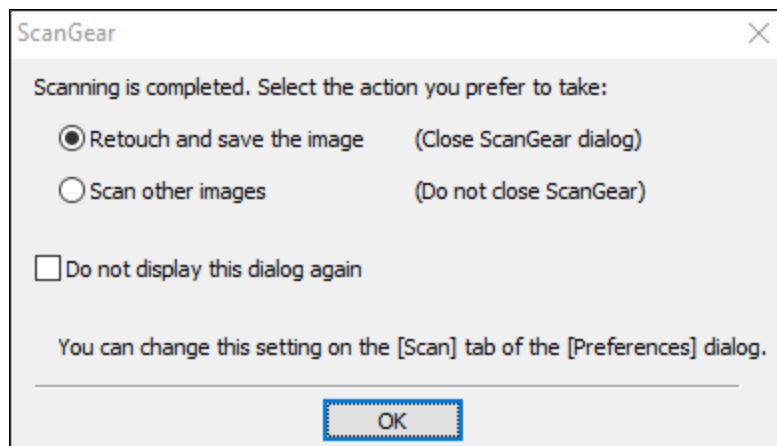


Figure 4-111 Selection after scanning the reference transparency

13. Save the scanned files in a convenient folder on your computer.  
Next, you load these files to GrabCAD Print for analysis.
14. Once you have finished the scans, wet a cleaning cloth with isopropanol and clean the scanner platen.  
**Important:** Always wear gloves when handling these items.

### Analyzing the Transparencies

After scanning the test pattern and the reference grid, they are analyzed by GrabCAD Print, and calibration parameters are calculated.

#### To analyze the transparencies:

1. Open GrabCAD Print, and click on the name of the current printer to open the *Select a Printer* list.



Figure 4-112 Opening the printer list

2. Click the *Printer Details* icon for your printer to open the pane displaying printer properties.

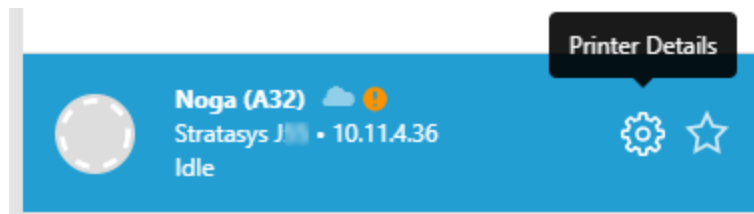


Figure 4-113 Opening the printer properties pane

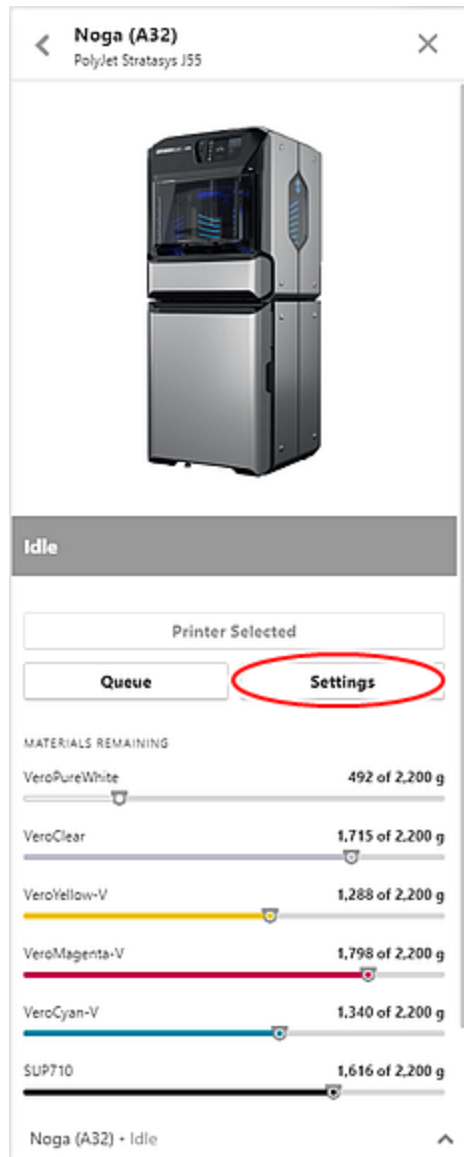


Figure 4-114 Printer properties pane

3. Click **Settings** (above) to open the *Settings* pane (below).

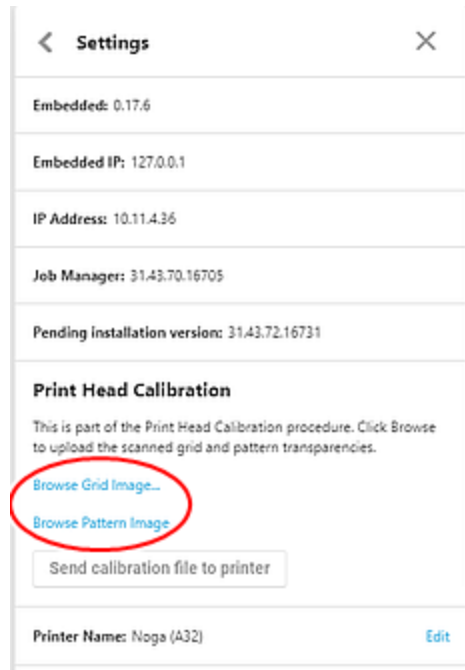


Figure 4-115 Settings pane

4. Click **Browse Grid Image** and **Browse Pattern Image** to import these files.  
GrabCAD Print calculates the head/software calibration parameters and saves them in a file on your computer.
5. Click **Send calibration file to printer**.



Figure 4-116 Sending calibration parameters to the printer software.

**Note:** GrabCAD Print can send the calibration file to the printer only if the computer has a connection to it. If you need to manually transfer the calibration file to the printer computer, continue with "Transferring the Calibration File Manually" on page 4-78.

## Applying the New Parameters

1. At the printer, select **Head Calibration** to open the wizard again.



2. In the opening wizard screen, click **Start** to begin.
3. In the following screen, select **Load calibration parameters**.

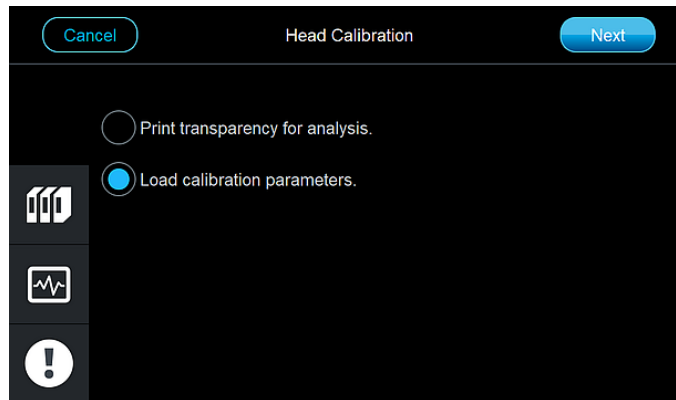


Figure 4-117 Wizard process selection

- In the following screen, select **Load the calibration parameters from GrabCAD Print**.

**Note:** If the printer and the GrabCAD client are not connected via the same network, select **Load the calibration parameters previously saved**.

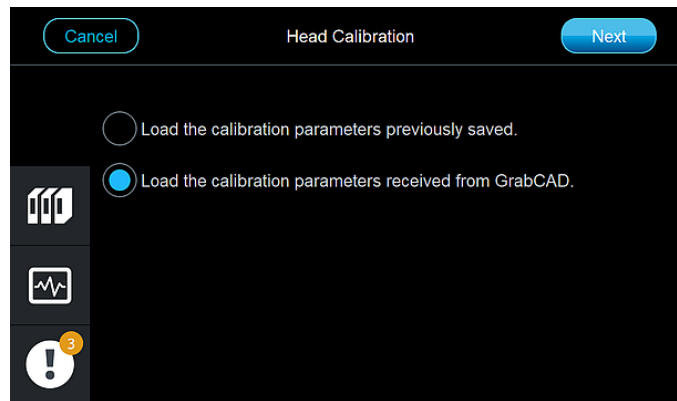


Figure 4-118 Loading the new calibration parameters

When you tap **Next**, the new calibration parameters are applied to the printer software.

**Note:** If the calibration file was not transferred to the printer computer from GrabCAD Print, the screen shown above does not appear. See "Transferring the Calibration File Manually" below.



After loading the parameters generated by GrabCAD Print, they are deleted from your computer. Therefore, you can only apply them once.

### Transferring the Calibration File Manually

If the GrabCAD client (the computer running GrabCAD Print) does not have a connection to the printer, transfer the calibration file to the printer computer, as follows:

- On the GrabCAD client used for scanning the transparency, open the folder `C:\Users\username\AppData\Roaming\Stratasys\GrabCADPrint\GCPrint\tmp`.
- Copy the file **Parameters.csv** to a USB flash drive or to a shared folder on your local network.
- If you are using a USB drive, insert the flash drive to the USB port on the printer.
- Start the Head Calibration wizard.





- In the following screen, select **Load calibration parameters**.

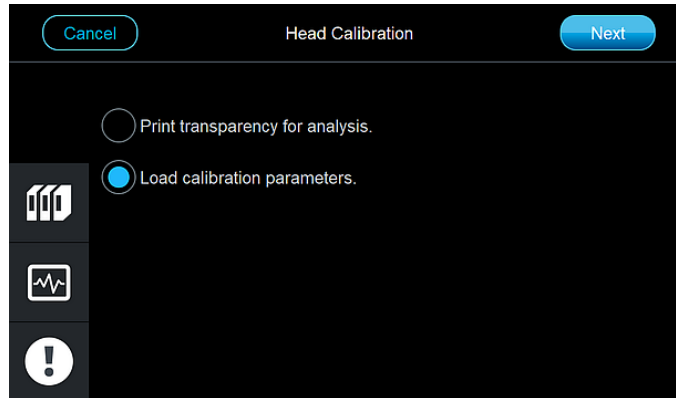


Figure 4-119 Wizard process selection

- Select a source, USB drive or network folder.

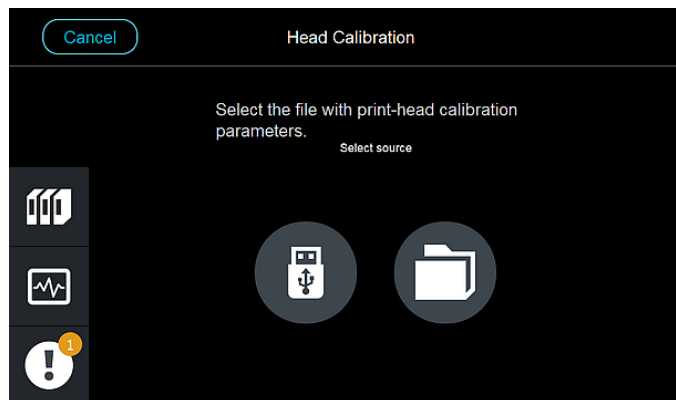


Figure 4-120 Selecting a source for loading calibration parameters

- Select the file **Parameters.csv** and tap **Load**.

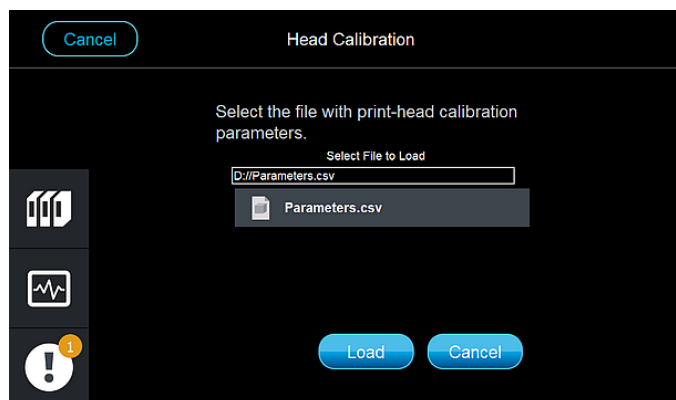


Figure 4-121 Selecting the calibration file

The new calibration parameters are applied to the printer software.

## Lubricating the Z-Axis Screw

The Z-axis lead screw should be lubricated with a small amount of machine grease every three months. This ensures continued smooth raising and lowering of the build tray during printing.

### To lubricate the Z-axis screw:

1. Prepare machine grease (supplied in the Start-Up kit).
2. Open the printer.
3. Put on a cleaning glove.
4. Squeeze a pea-size amount of grease on your finger, and spread it on the Z-axis screw, near the build tray.

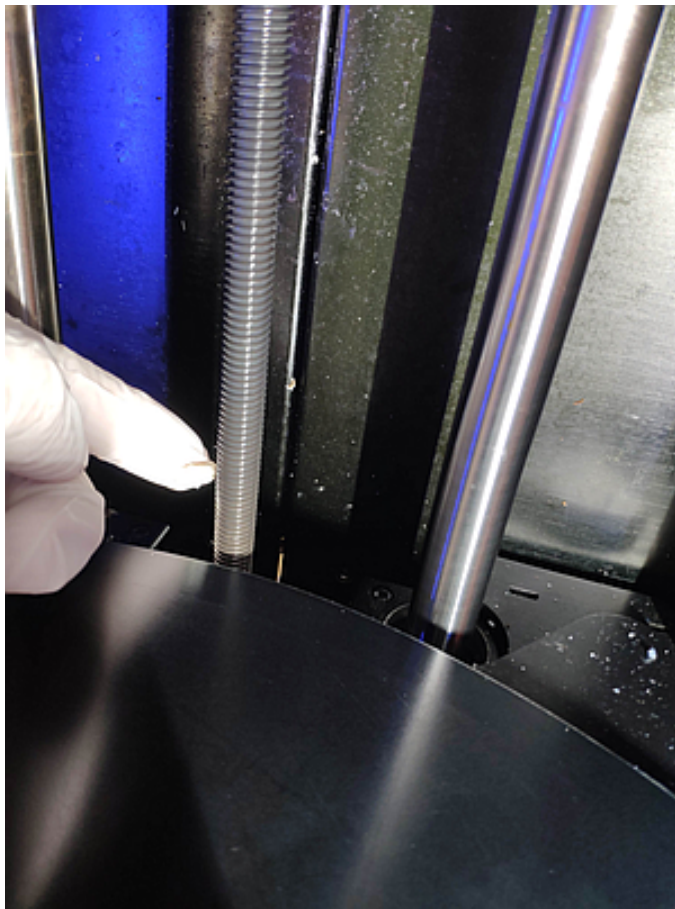


Figure 4-122 Roller and waste collector

When the build tray rises and lowers, during normal printer operation, the grease will spread over the length of the Z-axis screw. (There is no need to spread the grease manually.)

## Calibrating the Weight Sensors

Sensors measure the weight of the material cartridges and the waste container in the printer. It is important that you occasionally check that the weight measurements are accurate to prevent unnecessary waste of printing materials. It is recommended that you run the Weight Sensor Calibration wizard for all cartridge slots every six months. You can also check and calibrate particular weight sensors.

### To calibrate weight sensors:

1. From the *Wizards* screen, select **Weight Sensor Calibration**.



2. In the opening wizard screen, click **Start** to begin.
3. When the following screen appears, select the sensors to calibrate.

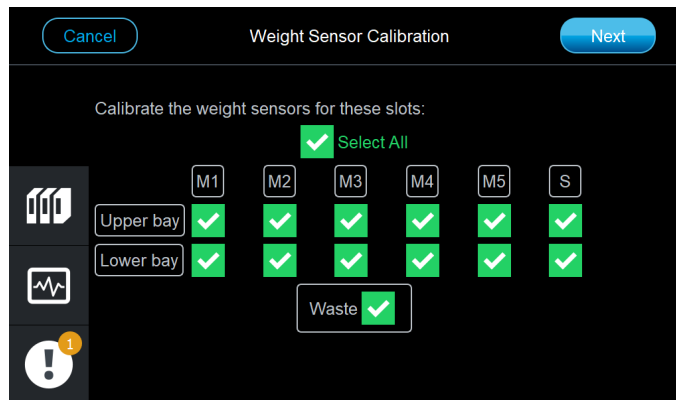


Figure 4-123 Selecting the sensors

By default, all sensors are selected. If you tap **Select All**, the selections are canceled. Then you can select specific sensors to calibrate.

4. Follow the instructions in the next wizard screens for removing cartridges and then replacing them with new (full) cartridges until the weight sensors are calibrated.

## Replacing the Waste Container

Printer waste contains partially cured polymeric material, collected during normal operation and maintenance of the printer. For safety and environmental reasons, this material is kept in a special leak-proof, disposable container.

The container has a capacity of over six kilograms of waste material—usually enough for several months of printer use. The printer application displays a warning message when there are 6 kilograms of material in the container, and stops the printing when the net weight reaches 6.5 kilograms. Above 6 kilograms, the software does not allow you to start a printing job or activity until you replace the waste container.

You can monitor the weight of the waste container in the *Materials* screen of the printer interface.

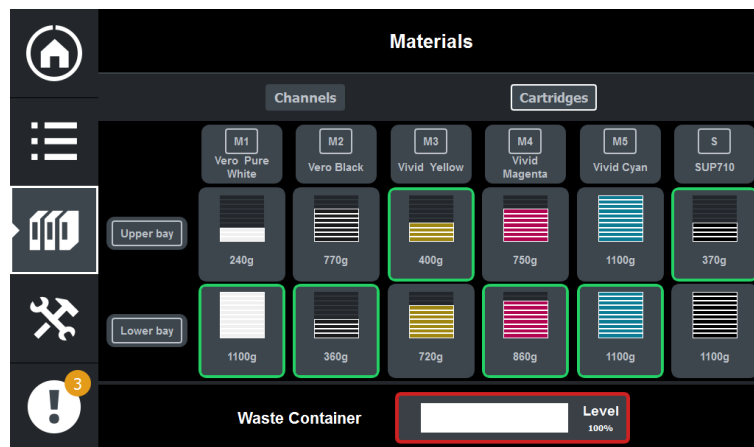


Figure 4-124 Materials screen

The waste container consists of a sealed bag inside a cardboard box. You typically dispose of the entire waste container—including the box. Therefore, you must assemble a new box and insert a new waste bag before you can install it in the printer.



Replacement boxes, waste bags, and sealing caps are supplied in the printer start-up kit and in the preventive-maintenance kit.

### To prepare a new waste container:

1. Assemble the cardboard box, making sure to punch out the perforated sections.
2. Unfold a new waste bag—so that it expands—and insert the bag's screw-connector into the hole in the top of the box.

**Note:** Do not close the box until you connect the waste drain tube from the printer.

**To replace the waste container:**

1. Open the materials cabinet.

The waste container is the box at the bottom of the cabinet.



Figure 4-125 Accessing the waste container

2. Carefully slide out the waste container to remove it from the printer.



Figure 4-126 Removing the waste container

3. Place the new waste container next to the full container.

4. Unscrew the cap securing the waste drain tube and connect it to the new container.

**Important:** Hold the opening in the waste bag with one hand while attaching the waste tube. Otherwise, the bag will be twisted, and the flow of waste will be restricted.

5. Close the full container with the cap supplied with the new waste container.

**Note:** The sealing cap contains an inner stopper that prevents leakage when the cap is tightened. Do not be concerned that air can still flow through the opening on the top of the cap, since the inner stopper seals the waste container.

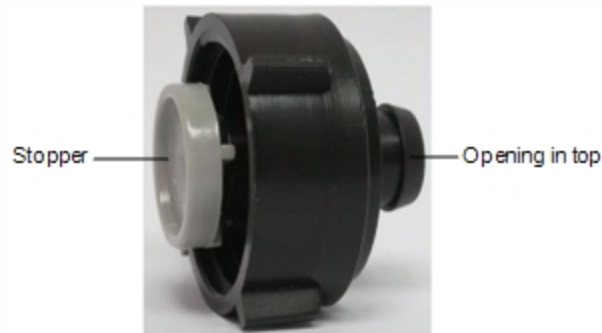


Figure 4-127 Waste container sealing cap

6. Close the new waste container.
7. Position new the waste container in the printer.

**Note:** Make sure that the waste drain tube is not crimped or twisted, and that it is not pinched by the container.

8. Close the materials cabinet.



Dispose of the full waste container in accordance with environmental and safety requirements.

## Cleaning the Exterior Panels

The painted exterior plastic panels of the printer has a durable finish, offering excellent chemical resistance to common cleaning materials. Follow the recommendations below when cleaning these areas of the printer.

### Acceptable Cleaning Agents

- mild soap solution
- common household cleaners and window cleaners
- common commercial and industrial detergents, 5% solution in water
- alcohol (ethanol, isopropanol), 10% to 40% solution in water

Wipe the exterior of the printer, using a soft cloth moistened with the cleaning solution.

### Unacceptable Materials

- industrial solvents
- cleaning agents containing hydrocarbons, ketones, esters and lacquer thinners
- spray disinfectants
- abrasives and agents which could wear away the panel finish

## Cleaning the UV Screen

The transparent sections of the printer door and the windows are made of strong, acrylic material that screen out harmful UV radiation. Use extreme care when cleaning them to prevent the appearance of scratch marks.



### Caution

Do not use abrasive cleaners or cleaning fluids containing ammonia, alcohol, acetone, benzene, carbon or tetrachloride. These materials can cause permanent damage to the surface.

### To clean the UV screen:

1. Blow off surface dust.  
Do **not** wipe the surface to remove dust; this might scratch the surface.
2. Prepare a 1-percent solution of mild dish-washing soap in water—about two teaspoons (10 ml) in a liter of water.  
**Note:** While soapy water is effective for cleaning, commercial products are also available for cleaning acrylic surfaces (for example, Novus® and Brilliance®). These products give the surface antistatic, smudge and scratch-resistant properties.
3. Soak a micro-fiber cloth in the solution.  
Do not use paper towels, which can cause scratch marks.
4. Thoroughly wet the surface with the cloth. Do not wipe!
5. Rinse the cloth with clean water.

6. Absorb the solution from the acrylic surface with the cloth, without applying pressure.
7. If necessary, repeat to remove any remaining marks, or apply clean water to rinse the surface.
8. If the surface is still wet, you can dry it with a clean, micro-fiber cloth by gently wiping in one direction.



If convenient, you can apply the cleaning solution and water to the acrylic surfaces with a spray bottle instead of with the cloth.



# 5

## Handling Printed Models

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## Removing 3D Prints After Printing

When printing is completed, you should allow the 3D prints to cool as much as possible before handling them. If additional 3D prints do not have to be produced on the printer, it is best to let the 3D prints cool in the printer, with the cover closed, as long as possible.

**If the printer must be used to produce additional 3D prints as soon as possible:**

1. Let the 3D prints cool on the build tray for at least 10 minutes.
2. Lock the build tray.
3. Put on protective gloves and eyewear (for WSS150).



**Warning:**

Wear protective gloves when handling 3D prints before they are washed.

4. Very carefully, remove the 3D prints from the tray with a scraper or spatula (supplied in the tool kit), taking care not to pry or bend the 3D prints.



**Warning: Sharp Object Hazard**

Directing the scraper toward body parts can result in injury. When removing the parts, always push the scraper away from you.

5. Place the 3D prints on a flat surface, and cover them with a cardboard box or paper hood.  
This allows them to cool slowly and evenly.
6. Let the 3D prints cool for several hours.

## Removing the Support Material

After the 3D prints have cooled, the support material must be removed. This can be done by different methods, depending on the size of the 3D print, how delicate it is, the amount and location of the support material, and other factors. The methods described in this section refer to removing general-purpose support materials from 3D prints, for most printing applications. Use this information as a guide, and adapt the methods (or a combination of them) for cleaning your 3D prints.



For special printing applications, refer to documents on the [Stratasys Support Center](#) or consult a Stratasys 3D printing expert.

The following types of support material available:

- TrueDent, a biocompatible support material for dental appliances (J5 DentaJet Only).
- WSS150, a water soluble support material available for J55 Prime and J5 MediJet printers only.  
This support material dissolves easily in water and can be removed by soaking in a still water bath, in a dishwasher, or a sous vide device.
- SUP710/SUP711, a gel-like support material.  
This is a breakaway support material that can be removed manually by hand, water pressure, brushing, or other mechanical means.  
SUP711 is available for J5 DentaJet Only.

### Removing TrueDent Support Material (J5 DentaJet Only)

**Important:**

For support removal and post-processing instructions for dental appliances, refer to TrueDent Best Practice document on the [Stratasys Support Center](#) or consult a Stratasys 3D printing expert.

### Removing WSS150 Support Material (J55 Prime and J5 MediJet Only)

WSS150 support material can be dissolved in water using one of the following methods, or a combination:

- Using tap/still water  
While wearing protective gloves, place the printed parts in a container filled with tap water, at room temperature, and wait until the support material dissolves completely. Soaking time depends on the printed part and the amount of support material.
- Using dishwasher  
While wearing protective gloves, place the parts in the dishwasher on a flat, rigid surface, such as a cooking grate, in the same orientation as they were printed to prevent bending or curling.
- Using a sous vide device  
While wearing protective gloves, place the parts in a container filled with tap water on a mesh in the same orientation as they were printed to prevent bending or curling. The temperature can be precisely controlled/optimized for complex and delicate geometries. It is faster than using static water and slower than a dishwasher on simple geometries.



#### Printing, Post Processing and Waste Handling for WSS150:

- For detailed support removal guidelines and more information on a suitable dishwasher, refer to the "WSS150 Best Practice".
- The solution of WSS150 dissolved in water can be solidified using the Stratasys L2S (Liquid to Solid) solidifying powder. For detailed instructions on waste handling and the solidification process of the WSS150 wastewater, refer to "WSS150 Wastewater Processing and Handling Using L2S".

These documents are available for download on the [Stratasys Support Center](#) . If necessary, consult a Stratasys 3D printing expert.

### Removing SUP710/SUP711 Support Material

The SUP710/SUP711 support material can be removed from 3D prints using the following methods, in this order:

1. by hand
2. water pressure (in a suitable cleaning unit)
3. 1% caustic soda solution (recommended for a smooth finish)



WSS150 cannot be removed using the methods listed above.

### Removing SUP710/SUP711 Support by Hand

While wearing protective gloves, break away excess support material on the outside of the 3D print. For delicate 3D prints, use a toothpick, pin or small brush after dipping the 3D prints in water.

## Removing SUP710/SUP711 Support with Water Pressure

For most 3D prints, the most efficient way to remove support material is by using a high-pressure water jet. One suitable system is the Objet WaterJet cleaning unit. This device is marketed by Stratasys.

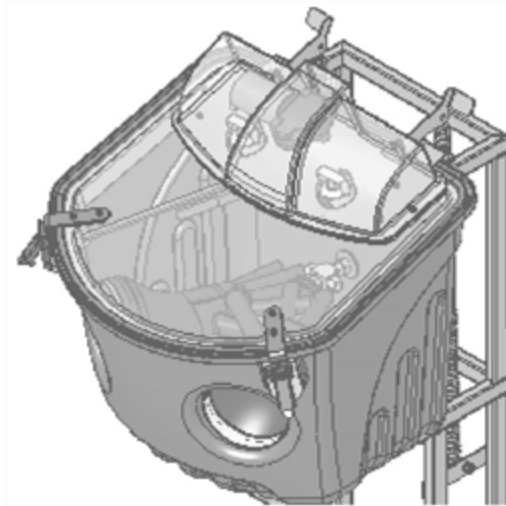


Figure 5-1 Objet WaterJet Cleaning Unit

To clean a 3D print using this device, you manipulate it and the water using the built-in, waterproof sleeves. A pump turns ordinary tap water into a high-pressure jet. A wiper keeps the window clear.



Use caution when cleaning delicate 3D prints with high-pressure water systems.

## Removing SUP710/SUP711 Support with Caustic Soda

Soak 3D prints in a 1-percent solution of caustic soda (sodium hydroxide) to remove support material from difficult-to-reach areas and to give the 3D print a smooth, clean finish. The amount of time you soak the 3D prints in the solution depends on how delicate it is and how much support material needs to be removed, but it is typically between half-an-hour and several hours. In any case, you should remove as much support material as possible before the caustic soda treatment, and rinse the it thoroughly (with a water jet) afterwards.



### Warning

Caustic soda may cause chemical burns, scarring and blindness. Mixing it with water generates heat that could ignite other materials. Never pour water into caustic soda. When diluting the solution, always add caustic soda to water. Take adequate safety precautions; always use nitrile gloves when handling caustic soda and 3D prints soaked in it.

## Post-Printing Treatment

Post-printing treatment is recommended for 3D prints with several special-purpose materials or for special applications. Recommendations for treating and finishing 3D prints after printing are described in the Best Practices for the desired printing material available on the [Stratasys Support Center](#).

### Photobleaching for Transparent 3D Prints

3D prints fabricated with clear materials, such as VeroUltra ClearS (RGD821) have a slight yellow tint when removed from the printer. This is especially true for 3D prints with a glossy finish. The yellow tint fades naturally over time, but you can greatly accelerate this process by using a suitable photobleaching treatment. This involves exposing 3D prints to intense light immediately after printing.



Photobleaching methods and instructions are described in the Best Practices for the relevant clear material. These are available on the [Transparent materials page on the Stratasys Support Center](#).

Refer to the Best Practices for:

- VeroClear RGD810
- VeroUltra ClearS RGD821

## Storing 3D Prints

3D prints are cured as they are printed, making them safe and stable for a long time. However, proper storage conditions are necessary to prevent deforming.

- Keep 3D prints at room temperature and in a low-humidity environment.
- Do not expose 3D prints to direct sunlight and other heat sources.