



stratasys[®]

J750

3D Printing System



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7,996,101

8,219,234

8,278,866

8,323,017

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8,781,615

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About This Guide

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Using This Guide

This user guide provides instructions for installing, operating and maintaining J750 3D printing systems. It explains how to use features, and provides practical examples to guide you as you use the system.

The text and figures in this guide are based on the J750 3D printer, printer software version 85.1.0 and PolyJet Studio software version 10.8.10.

This guide assumes that—

- all the hardware, software, and network components of your J750 system are installed, configured, and operating correctly.
- the operator has a working knowledge of the Windows® PC platform.

For More Information

Visit www.stratasys.com to download additional documents for this printer, including documents in other languages. Also available on this site: details about consumables and support contacts.

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

Terms Used in This Guide

| | |
|--------------------------------|--|
| Build tray | <p><i>In the print preparation application:</i> The surface displayed on the screen that represents the actual build tray in the printer.</p> <p><i>In the printer:</i> The surface upon which models are produced.</p> |
| Cleaning fluid | 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 standard material cartridges. |
| Client/user workstation | 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.) |
| Connex™ | The technology of printing models by jetting multiple materials simultaneously from the print heads. This technology enables J750 printers to print in Digital Material mode. |
| Digital Material | Combinations of model materials fabricated in the printer from the basic model materials installed. |
| Digital Material Mode | The printer mode used to print a job using two different model materials. (This mode can also be used to eliminate the need for performing the Material Replacement procedure when printing with a single model material.) |
| GrabCAD Print | A software application for preparing print jobs on a variety of 3D printers, including the Stratasys J750 printer. |
| Manager™ | The part of PolyJet Studio software that manages production jobs before they are sent to the PolyJet printer. |
| Mixed part | Models whose parts are printed using more than one model material. |
| Mixed tray | A build tray containing objects, each of which is designed to be printed using a different model material. |
| Model material | Material used for building models. |
| PolyJet Studio™ | A software application that prepares files for printing on Stratasys PolyJet printers. |
| OBJTF | The extension of a file that contains all of the information needed for a model-printing job on PolyJet 3D printers. An <i>objtf</i> file is used by PolyJet Studio to send a print job to a PolyJet 3D printer. |
| OBJZF | The extension of a compressed “wrapper” file containing all of the files used in an PolyJet Studio build tray. Using <i>objzf</i> files, a printing job can be saved as a single file, for convenient storage and transfer. |
| Printer computer | The computer inside the J750 printer that operates it. |
| Printer interface | The GUI (graphical user interface) used for controlling the J750 printer. |
| Printer software | Software running on the computer inside the J750 printer, that controls all printer operations. |

| | |
|-------------------------|---|
| Resin | The base substance from which photopolymer printing materials are made for use in Stratasys PolyJet printers. In PolyJet Studio and printer-application screens, “resin” refers to cartridges of model and support materials. |
| STL | A file used for printing 3D models. |
| Support material | Material used for supporting the structure of models during production. |

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:

Cover Interlock Switch

The power supplied to the UV lamp(s), the tray heater and the motion motors is turned off when the cover 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 cover is locked while the printer is working. If you do manage to lift it, the UV lamps and the motion 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 section of the cover blocks harmful UV radiation, allowing the operator to view the model as it is being made.



Figure 2-1 Front view of the Stratasys J750 printer

Circuit Breaker

The power to the printer is turned off in case of electrical overcurrent.

Note: The circuit breaker is only accessible to service personnel.

UV-Lamp Overheating Protection

The power supplied to the UV lamp and the motion motors is turned off if the temperature around the lamp reaches 90°C (194°F). A label on the UV-lamp cover indicates if the temperature has exceeded 65°C (150°F).

Grounded Chassis

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





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



If the J750 3D printing system is not used as specified in this guide, the safety features may not provide adequate protection.

Symbols and Warning Labels

This following table lists the warning labels located on or in J750 printers.

| 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. |
|  | High voltage | Near the UV lamp connectors. Near the power-supply enclosures. | Risk of electric shock. |
|  | Ultraviolet radiation | Near the UV lamps. | Risk of injury from ultraviolet radiation. |

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 cord 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.
- 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 15 centimeters between ventilation openings and walls or other objects.

Printer Operation

- The printer should only be operated by persons trained by a Stratasys customer-support 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 cover when closing it.
- Never attempt to open the printer cover 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 UV lamps and the print block.

- UV Radiation** The UV lamps used in the printer emit dangerous radiation.
- If the UV lamps remain on when the printer is open, do not stare directly at the UV light. 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 J750 system 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 J750 system 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 printing-material cartridge 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 models 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 at least 20 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.

UV Lamps

UV lamps used by the printer to cure printing materials contain a small amount of mercury. In the unlikely event of lamp breakage, avoid inhaling mercury vapor, and ventilate the room. If the lamp ruptures (breaks) during operation, leave the room and ventilate it thoroughly for about 30 minutes.

Use protective gloves to prevent contact with mercury and other lamp components. Carefully remove spilled mercury with a method that prevents the generation of mercury vapor, such as a syringe, packing tape or paper.

Place the broken lamp, mercury and contaminated materials in an air-tight, non-metallic container. Dispose of the container in accordance with applicable regulations.

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 printed models can be disposed of as ordinary office trash. However, special care is required when handling printer waste (uncured printing material).

- Printing Materials
 - When removing the waste container from the J750 printer, wear neoprene or nitrile gloves.
 - To prevent liquid waste from splashing into the eyes, wear safety goggles.
 - Liquid waste from the J750 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.

- UV Lamps UV lamps used by the printer to cure printing materials contain a small amount of mercury, and are considered “Universal Waste.” Recycle or discard used lamps in accordance with applicable regulations.

Broken lamps:

After ventilating the area, use protective gloves and carefully remove spilled mercury with a method that prevents the generation of mercury vapor, such as a syringe, packing tape or paper. Place the broken lamp, mercury and contaminated materials in an air-tight, non-metallic container. Dispose of the container in accordance with applicable regulations.

3

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The advanced capabilities of J750 3D printing systems are made possible by technology specially developed by Stratasys for printing models simultaneously with up to six different Model materials. Print jobs can be set up and sent to the J750 printer with either of these applications:

- PolyJet Studio
- GrabCAD Print

These applications are described in the following chapters. With both of them, you can achieve the following results when printing 3D models on the J750 printer:

- 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—from flexible to rigid.
- You can print parts (shells) of the same model—simultaneously—with different materials (or material combinations)
- You can print objects that have a “coating” made from a different material than the main part of the object.
- 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 PolyJet Studio for printing the model with the desired colors.

Both PolyJet Studio and GrabCAD Print enable you to split models into component parts (“shells”) so you can isolate, manipulate and print parts of a model. Then, you can assign model materials and other characteristics to the shells. However, you have ultimate control when separating models into shells by preparing *stl* files with your CAD software.

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

Work Configurations

The Stratasys J750 3D printing system can be set up as a single-station system or as a multi-station system. 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, controls the printing.

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

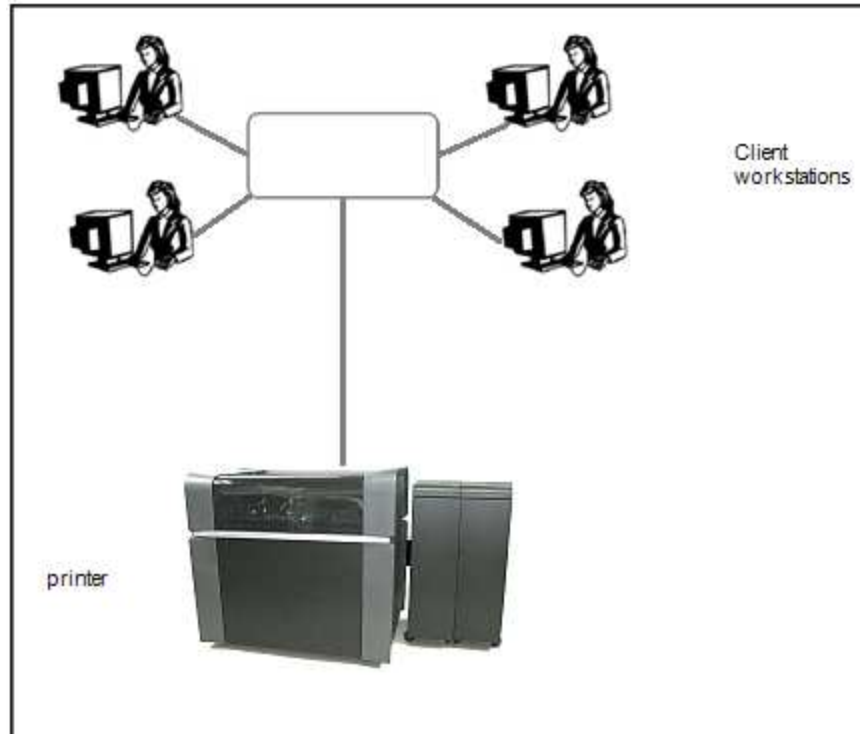


Figure 3-1 Multi-client network configuration

Source Files

J750 printing systems produce three-dimensional models designed with most CAD tools and some other 3D applications.

PolyJet Studio supports these file formats:

- [STL](#)
- [VRML](#)

GrabCAD Print supports STL and, VRML files, and, in addition, 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.

J750 systems feature the capability of producing different types of model files simultaneously.

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. The result is that high-quality object descriptions mean very heavy files.

Most CAD software can export STL files. PolyJet Studio opens these files for printing models on the J750 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 model while designing models in a CAD program. No further color assignment is needed in PolyJet Studio or in GrabCAD Print. (PolyJet Studio supports the VRML 2.0 format, also known as VRML 97).

When you create a VRML file in CAD software, two files are created: a *wrl* file, containing the model's geometric information of the model, including texture, and a picture file (*bmp*, *png*, *jpg*, or *tiff*), containing the model's color information. Before inserting a VRML file onto the build tray, save the VRML file and its corresponding picture file in the same directory.

Printing Materials

J750 printers produce models by jetting thin layers of printing materials on the build tray, until the complete model is formed. Two types of material are used in this process:

- *Model* material—which makes up the finished model
- *Support* material—which fills gaps and spaces in the model 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.

Storage

Materials used for printing models with J750 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 15–25 degrees Celsius (59-77 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 models 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. If necessary, the cartridges can be disassembled for recycling.

Work Environment

Extreme heat and humidity conditions can adversely affect the operation of the J750 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

Workstation Requirements

The requirements for client computers running PolyJet Studio are listed in the J750 Site Preparation Guide. To download this document, [click here](#).

To see the requirements for client computers running GrabCAD Print, go to: help.grabcad.com/print/system-requirements.

Preparing Files for Use with PolyJet 3D Printing Systems

Before using design files with Stratasys 3D printing systems, make sure that they are in a file format supported by the applications you are using to send print jobs to the printer—PolyJet Studio or GrabCAD Print. (See "Source Files" on page 3-4.)

Converting CAD Files to STL Format

This procedure may vary slightly, depending on the CAD software used, but the following instructions generally apply.

To convert a file to STL format (in a CAD program):

1. From the File menu, select **Save As**.
2. In the *Save As* dialog box, open the *Save As Type* drop-down list and select *.STL.



Some CAD tools provide the option to combine all assembly shells into a single STL or to create a separate STL for every shell. The first option does not enable you to assign materials or colors to individual shells. The second option is preferred because it provides more flexibility when assigning materials or properties to individual shells.

3. Click **Options** and set the following parameters:

- Total Quality**—approximately 0.01 mm (deviation tolerance / linear-dimension tolerance)
- Detail Quality**—approximately 5° (angle tolerance)

Note: Lowering these values produces more accurate models, but results in larger files and longer loading and processing times. For this reason, it is generally not recommended that you use lower values.

4. In the file format option, choose *binary* or *ASCII*. (Both binary and ASCII formats can be used in PolyJet Studio. However, binary files are smaller, so this option is recommended.)
5. Click **OK** or **Save**.

After converting the model files, it is recommended that you check them for defects before opening them in PolyJet Studio and producing the model. You can do this in GrabCAD Print or in a third-party STL-repair application (such as Magics™, by Materialise®).



For more information, download [From CAD to Objet Studio Workflow for Connex Technology](#).

Converting CAD Files to WRL Format (VRML)

You can save CAD designs as VRML files (WRL format) for printing. If you assign RGB values or textures in the CAD design and then import the VRML file in PolyJet Studio, Digital Materials that provide the best color match are automatically assigned to the shells. The printer fabricates these Digital Materials from the base materials loaded in the printer.

PolyJet Studio supports VRML 2 files (also known as VRML97 files).

Applications for Preparing Print Jobs

Both PolyJet Studio and GrabCAD Print offer you a wide variety of file-preparation options that follow this basic procedure:

1. Defining the materials you want to use on the build tray
2. Inserting one or more objects on the build tray
3. Positioning the object(s) on the build tray
4. Configuring object and tray parameters
5. Sending the file to a 3D printer for production

PolyJet Studio PolyJet Studio is an application for preparing print jobs on Stratasys 3D printing systems. It consists of two main screens:

- Studio
- Manager

In the *Studio* screen, you prepare source files for production in the printer. Using PolyJet Studio to perform these tasks is described in detail in Chapter 5, "Using PolyJet Studio".


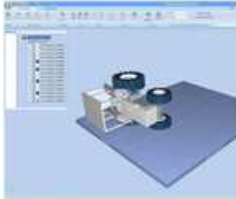


The *Manager* screen displays the queue and status for all jobs sent to the 3D printer.

GrabCAD Print GrabCAD Print is an application for preparing print jobs on a variety of 3D printers, including the Stratasys J750. These are the main features of GrabCAD Print:

- The same application prepares jobs for printing on multiple platforms, including Stratasys PolyJet and FDM printers (for supported printers, go to: help.grabcad.com/print/printers).
- Support for many CAD file formats (see supported formats at help.grabcad.com/print/file-formats).
- Automatic repair of 3D files.
- Scheduling and monitoring of multiple printers and print jobs, from local and remote computers and from mobile devices.
- Intuitive design and ease of use.

Workflows

With J750 printing systems, you have great flexibility in preparing model files and printing them. Below are the major workflows available.

| Stage | Workflow A | Workflow B | Workflow C |
|---|---|--|---|
| <p>CAD program*</p>  | <ul style="list-style-type: none"> • Design a 3D object. • Save it as a single <i>stl</i> file. | <ul style="list-style-type: none"> • Design a 3D object. • Save it as an assembly of <i>stl</i> files. | <ul style="list-style-type: none"> • Design a 3D object. • Apply colors to parts. • Save the object as a VRML/<i>wrl</i> file. |
| <p>PolyJet Studio / GrabCAD Print*</p>  | <ul style="list-style-type: none"> • Open (<i>Insert</i>) the <i>stl</i> file. • Separate the object into its components ("shells"). • Assign materials to the components. | <ul style="list-style-type: none"> • Open (<i>Insert</i>) the <i>stl</i> files as an <i>assembly</i>. • Assign materials to the assembly's components. | <ul style="list-style-type: none"> • Open (<i>Insert</i>) a VRML/<i>wrl</i> file. (<i>wrl</i> files contain model-material and color information.) |
| <p>•Save the build tray. / Send the build to the printer.</p> | | | |
| <p>J750 Printer</p>  | <p><i>Models are produced in the printer.</i></p> | | |
| <p>•Remove the Support material from the models</p> | | | |
| <p>Finished model</p>  | <p><i>Finished model.</i></p> | | |

3D printing workflows, from design to finished models

* In addition to the options shown, GrabCAD Print supports most native CAD file formats.

Installing 3D Printing Software

4

| | |
|----------------------|-----|
| PolyJet Studio | 4-2 |
| GrabCAD Print | 4-4 |

PolyJet Studio

During printer installation, PolyJet Studio software is installed as a printer server on the built-in printer computer. It is also installed on remote client computers, to prepare models for printing or for training and demonstration purposes.

This section is provided in case you need to reinstall or update PolyJet Studio on the printer server, or to install it on a client computer. The PolyJet Studio setup wizard guides you when installing this software. During installation, you choose to install either the printer-server application or the client application.

To install PolyJet Studio software:

1. Connect the USB flash drive (supplied with the printer) to a USB port.
2. On the USB flash drive, navigate to the PolyJet Studio installation file, and run it.

The following screen appears.



Figure 4-1 Installation selection screen

3. Select the type of installation required—client or server (printer computer)—and click Next.

When installation is complete, the following screen appears.



Figure 4-2 Final installation screen

4. Restart the computer to complete the software installation.

The installation process ends when the PolyJet Studio icon appears on the computer desktop.



If there is ever a need to uninstall the PolyJet Studio software, do **not** attempt to do so from the Windows Control Panel. (This does not completely remove all software components.) Instead—

From the *Start* menu, select All Programs > Stratasys > Uninstall PolyJet Studio.

GrabCAD Print

GrabCAD Print is an application for preparing and managing print jobs on the Stratasys J750 printer (and on other supported 3D printers). It is used instead of the PolyJet Studio application installed on the printer computer, and on remote client computers. To download GrabCAD Print, go to: help.grabcad.com/print/sign-up.

To use GrabCAD Print for the J750 printer, GrabCAD PolyJet Server is required on the printer server computer. This is the program that controls the actual printing, and is used instead of PolyJet Studio Server. To download GrabCAD PolyJet Server, go to: help.grabcad.com/print/j750.


5

Using PolyJet Studio

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Launching PolyJet Studio

After you install PolyJet Studio, a launch icon  appears on the Windows desktop. Open the application by double-clicking this icon, or by selecting PolyJet Studio from the Start menu.

Windows® 7 Security Warning

Depending on the User Account Control settings in Windows® 7, you might see the following warning when opening PolyJet Studio.

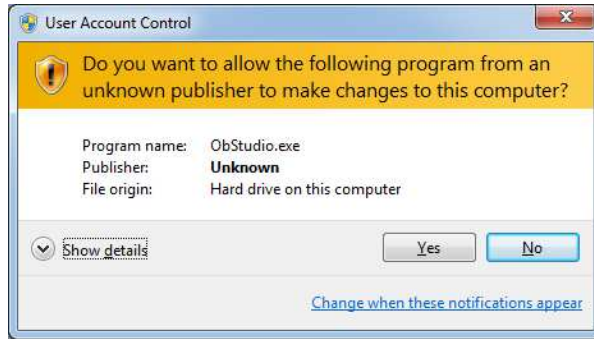


Figure 5-1 Security Warning

If you click Yes, PolyJet Studio opens. However, this warning message will appear each time you open the application, unless you change the User Account Control settings.

To prevent the warning message from appearing again:

1. Click the link at the bottom of the security warning dialog box (Change when these notifications appear).
2. In the *User Account Control Settings* screen, move the slider to Never notify.

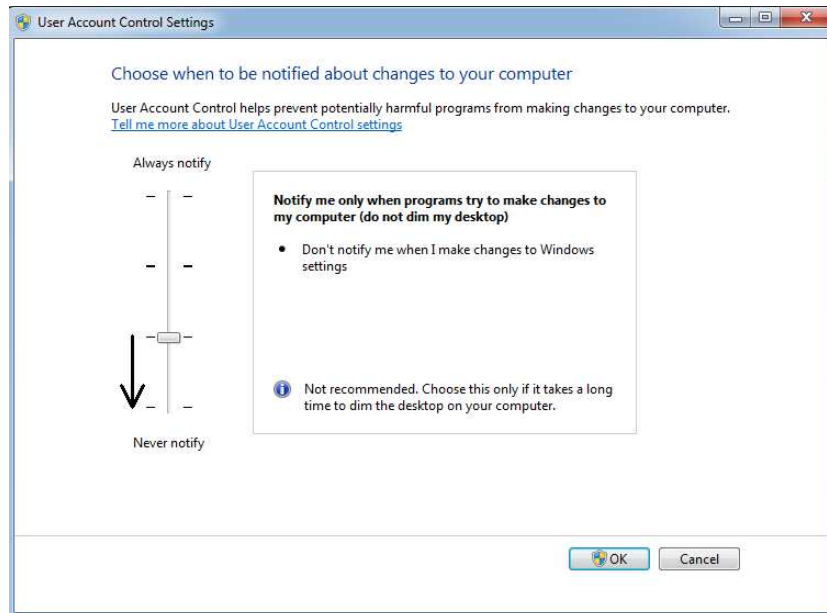


Figure 5-2 Changing the User Account Control settings

3. Click OK.
4. In the following dialog box, click Yes.



Figure 5-3 Confirming the change in the User Account Control settings

PolyJet Studio Interface

The PolyJet Studio interface consists of two main screens:

- **Studio**—for arranging models and preparing them for printing.
- **Manager**—for monitoring and managing print jobs.
This screen is described in "Monitoring and Managing Print Jobs" on page 5-43.

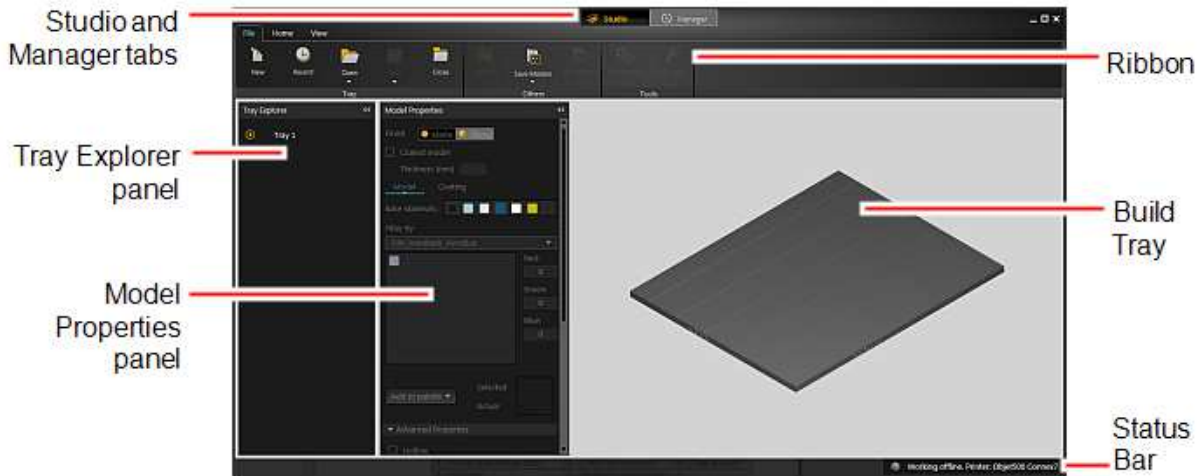


Figure 5-4 PolyJet Studio opening screen

Studio Screen

The *Studio* screen is controlled by ribbon icons and options in the *Tray Explorer* panel.

PolyJet Studio displays and enables options relevant to your current task. For example, certain icons on the ribbon are disabled until you place a model on the tray.

Tray Explorer

The *Tray Explorer* panel lists the objects placed on the build tray in a parent-child hierarchy. You can hide the *Tray Explorer* panel by clicking .

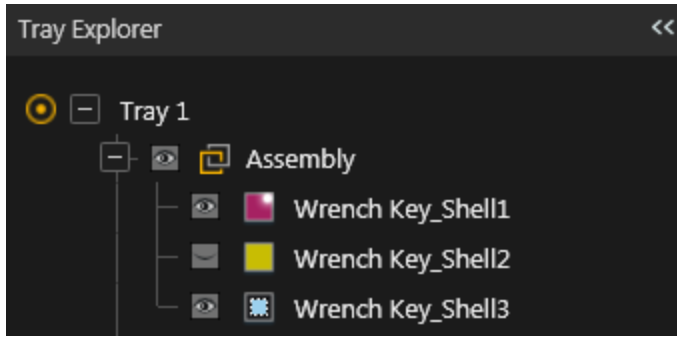









Figure 5-5 Tray Explorer (sample)

The *Tray Explorer* panel provides information about the models on the tray, based on the properties selected in the *Model Properties* panel.

| | |
|---|---|
|  | Assembly |
|  | Part with a glossy finish |
|  | Part with a matte finish |
|  | Part with a coating applied |
|  | VRML part |
|  | Part that is visible on the build tray (see "Assigning Properties to Hidden Objects" on page 5-21) |
|  | Part that is hidden from view on the build tray (see "Assigning Properties to Hidden Objects" on page 5-21) |

For example, the Tray Explorer panel shown above shows that the build tray contains an assembly of parts:

- Shell 1 has a pink color with a glossy finish applied to it.
- Shell 2 has a yellow color with a matte finish applied to it. This part is also hidden from view.
- Shell 3 has a light blue color with a black coating applied to it.

The *Tray Explorer* can contain multiple trays, but only the last tray added can be edited. Close the last tray listed in the *Tray Explorer* to edit the previous tray in the list.




Status Bar

The status bar in the bottom-right corner of the screen displays PolyJet Studio's connection status and the type of printer it is connected to.



Figure 5-6 PolyJet Studio status bar

Status Bar indicators:

-  PolyJet Studio is in offline mode (not connected to a printer).
-  PolyJet Studio is connected to a printer.
-  PolyJet Studio attempted to connect to a printer, but the printer is off or the server is not connected to a printer.

Preparing Models for Production

Model preparation involves the following basic steps:

1. Place objects or assemblies on the build tray.
2. If necessary, manipulate the object's size, orientation and position.
3. Select the materials and model finish.

Just as J750 printers can produce different models on the build tray using different materials, you can produce components of a model with different materials. To do this, each part of the model must be a separate *stl* file.

Placing Objects on the Build Tray

To print models, you open one or more files in PolyJet Studio and position objects on the tray.

To place an object on the build tray:

1. Select the *Home* tab.
2. Click Insert and select Insert Model, Insert Assembly or Insert VRML.



Figure 5-7 *Insert* menu

The *Open* dialog box appears.

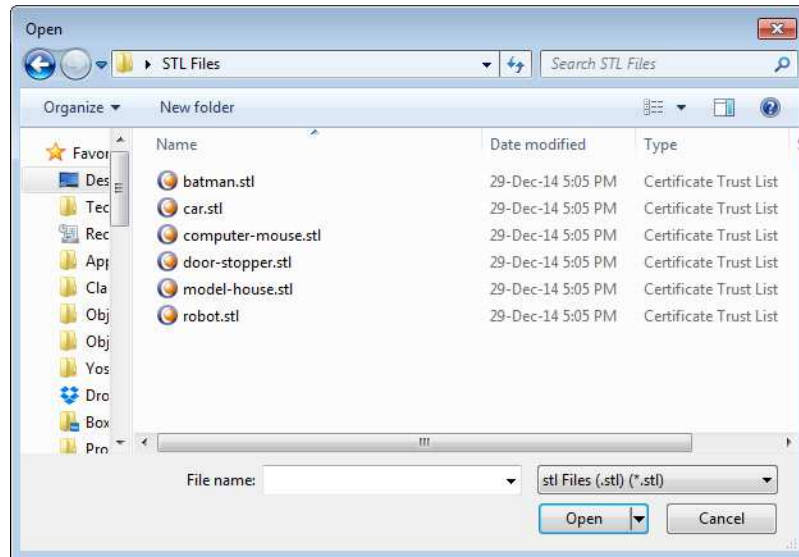


Figure 5-8 *Open* dialog box

3. Select a file and click *Open*.

You can open several files to place several models on the build tray by holding down the *Ctrl* or *Shift* keys and clicking on the required files.



You cannot place two different models with the same name on one build tray.

- If you clicked *Insert Model* and then selected multiple *stl* files, the *stl* files are placed on the build tray as separate, individual models.

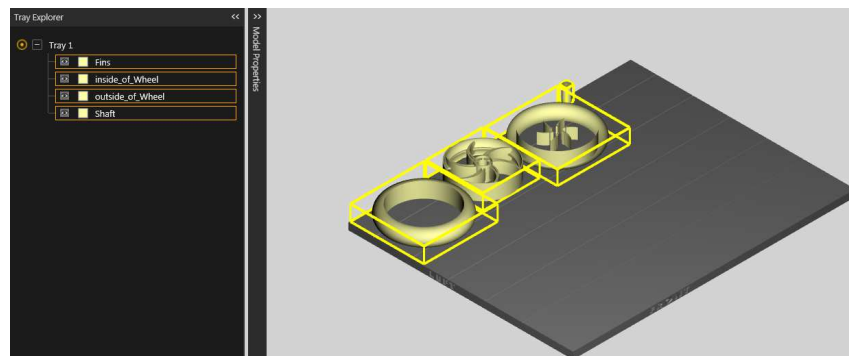


Figure 5-9 *stl* files placed as parts

- If you clicked **Insert Assembly** and then selected multiple *stl* files, the *stl* files are placed on the build tray as a single, integrated model. You can still apply different properties to the individual parts of the integrated model.

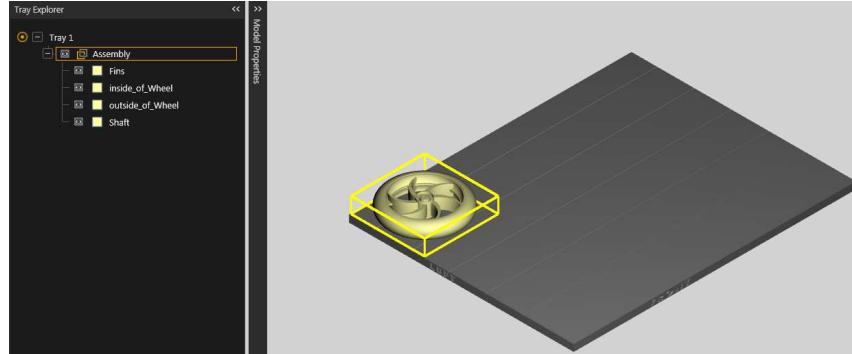




Figure 5-10 *stl* files placed as an assembly

Duplicating Objects

If you need to duplicate objects on the build tray, you can place the same object from its file more than once. However, that method is not effective if you want to duplicate an object that you have already modified in PolyJet Studio. Instead, use the duplicate function.

To duplicate a model or an assembly:

1. Select the model or assembly on the build tray or in the *Tray Explorer*.
2. In the *Edit* group on the *Home* tab, select the number of copies to add on the build tray .
3. Click .

Copying Object Properties


You can copy the properties assigned to one object and apply them to other objects on the build tray. The properties you can copy are:

- surface finish (matte or glossy)
- model material and/or color
- coating thickness, model material and/or color
- hollow settings



Dimension settings cannot be copied.

To copy object properties and apply them to other objects:

1. Select the object on the build tray or in the *Tray Explorer* with the settings that you want to copy (source).
2. In the *Edit* group on the *Home* tab, click the *Copy Settings* icon .
3. Select the object on the build tray or in the *Tray Explorer* that you want to apply the settings to (target).



- You can only apply settings to one object at a time.
- At least two objects must be on the tray to use this feature.
- This feature is not available for VRML files.

Selecting Objects

To manipulate an object on the build tray, or to assign properties to it (model material, building style, etc.), you must first select the object. You select an object by clicking it, either in the build tray or in the *Tray Explorer*. A yellow frame appears around the selected object and its name is highlighted in the *Tray Explorer*.

You can select multiple objects to assign properties to all of them.

To select multiple objects in the Tray Explorer:

- Press and hold the `Shift` key or `Ctrl` key while clicking additional objects in the list.
- To select an entire assembly, click an *Assembly* entry in the *Tray Explorer*.

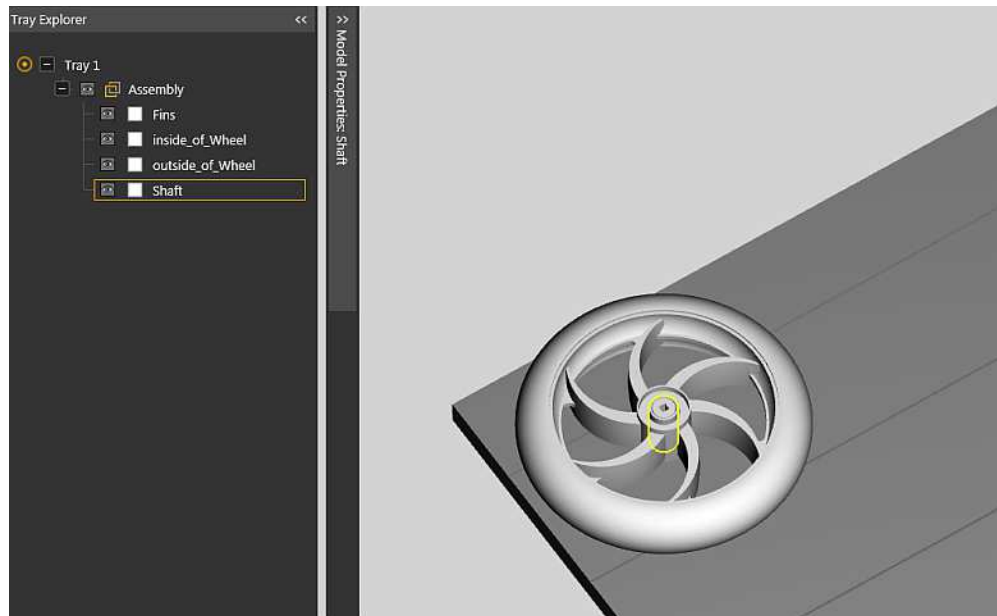


Figure 5-11 Assembly selected (yellow outline)

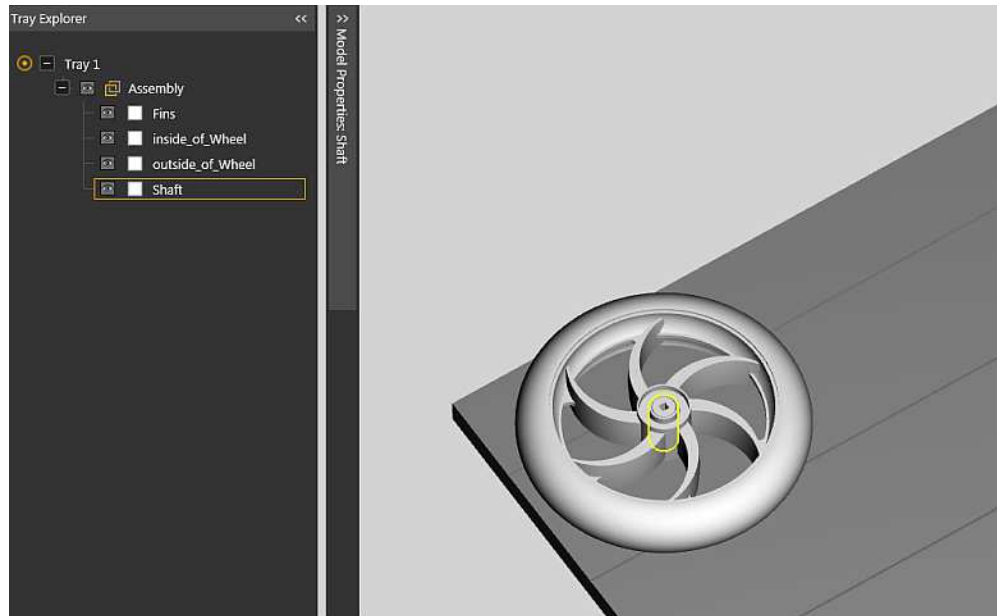


Figure 5-12 Individual part selected (yellow outline)

To select multiple objects on the build tray:

- Press and hold the `Ctrl` key while clicking additional objects.
- Draw a box around the objects with the mouse cursor (only objects that are fully surrounded by the selection box are included in the selection).

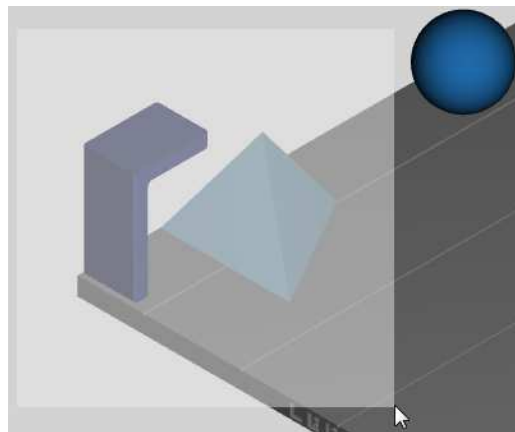


Figure 5-13 Selecting multiple objects




There is no limitation on the number or type of parts that can be selected. Any collection of selected objects is valid.

To select all objects on the build tray:

- In the *Selection* group on the *Home* tab, click the *Select All* icon .

To invert the selection of objects currently selected on the build tray:

- In the *Selection* group on the *View* tab, click the *Invert Selection* icon .

Assigning a Model Material to Objects

To assign a model material to objects:

1. Select an object on the build tray.

When an object is selected, its properties are displayed in the *Model Properties* panel. The model material color is also displayed in the Tray Explorer.

2. Select the desired material (see "Changing the Model Material" below).

Changing the Model Material

If PolyJet Studio is connected to a printer, the Model and Support materials currently loaded in the printer are automatically selected. If PolyJet Studio is being used off-line, default materials are loaded. The default materials cannot be customized.

When designing a tray, you can use Model and Support materials that are not currently loaded in the printer. To do so, you need to change (or add to) the material selection in PolyJet Studio.

To view and change the material selection:

1. On the *Home* tab, click  *Tray Materials*.
2. Make sure that the required Support material is selected from the drop-down list.
3. In the *Tray Materials* selection window, select up to six (6) base materials in the *Material selection* pane.



- Remove some or all materials to make room for others.
- Press and hold *Shift* or *Ctrl* to select multiple materials.

- Click **Add selected** to move the selected materials to the *Selected materials* section.

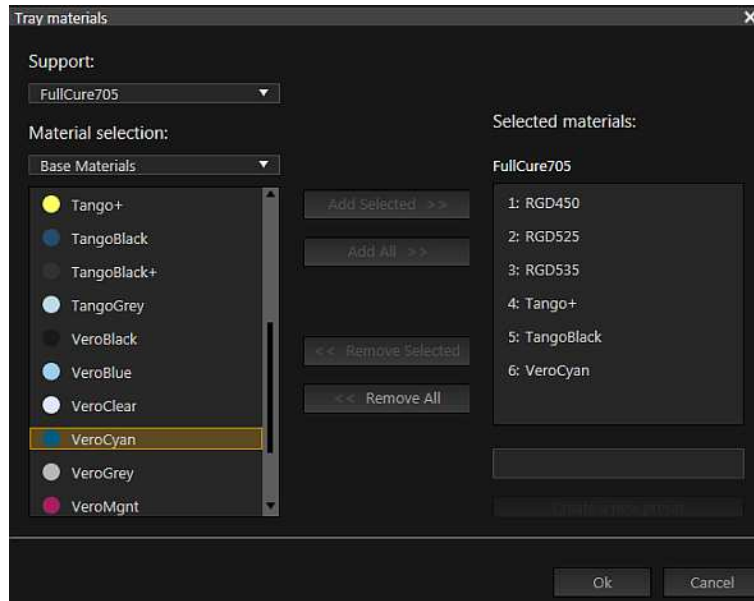


Figure 5-14 *Tray Materials* selection window

- Click **OK**.

The selected materials appear in the *Base Materials* section of the *Model Properties* panel when a model is selected.

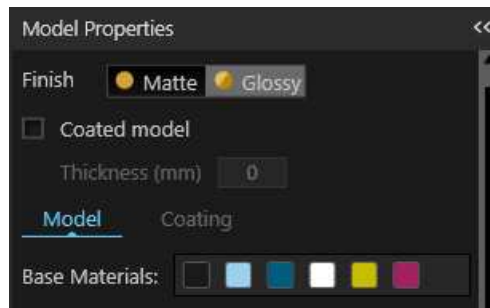


Figure 5-15 Base materials available

Digital Materials

You can produce models from a combination of materials to attain different shades of color and mechanical properties.

There are two ways to apply material combinations to models:

- by selecting from a list of pre-set digital materials
- by applying a custom color (created dynamically from the base materials available)

To select a pre-set digital material:

- Select a model on the build tray or in the *Tray Explorer*.

2. In the *Model Properties* panel, select a digital material group from the *Filter by* drop-down list.

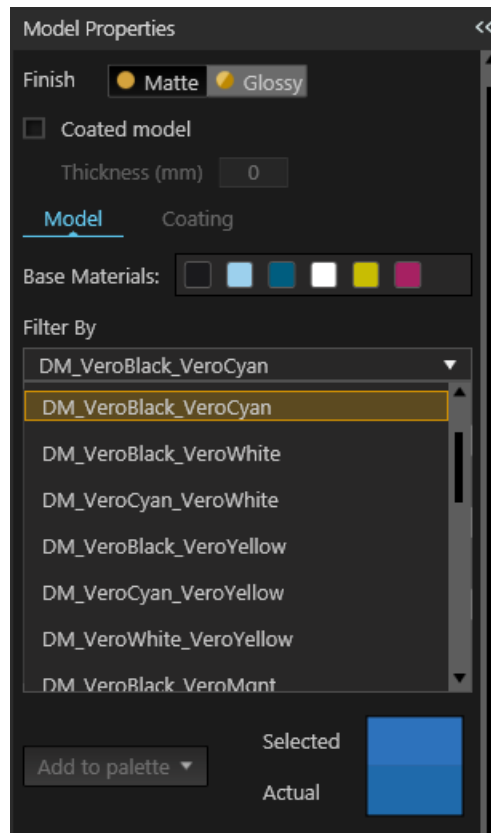


Figure 5-16 Selecting a pre-set digital material
The Digital Material palette appears.

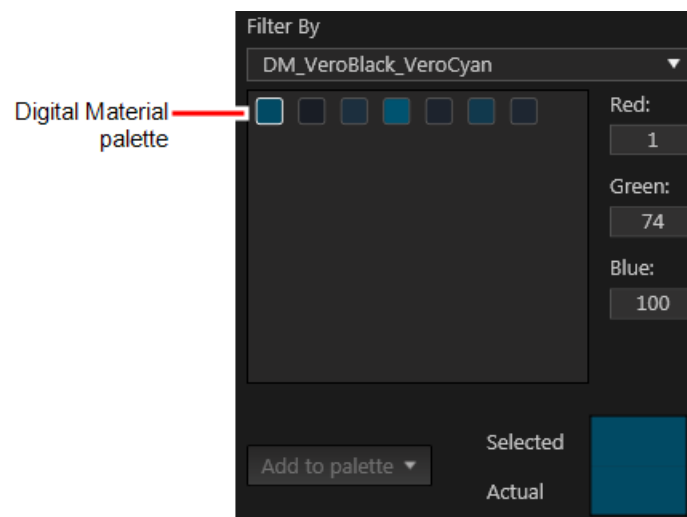


Figure 5-17 Digital Material palette

3. Select a digital material from the palette.

The *Selected* and *Actual* color swatches change to the color you selected.



When selecting a pre-set digital material, the "Actual" color is identical to the "Selected" color.

To apply a custom color (from the base materials available):

1. Select an object on the build tray or in the *Tray Explorer*.
2. Make sure that the materials selected in the *Tray Materials* screen include at least all of the following materials:
 - VeroBlack
 - VeroCyan
 - VeroMgnt
 - VeroPureWht
 - VeroYellow



The Color Picker is not available unless all of these base materials are selected.

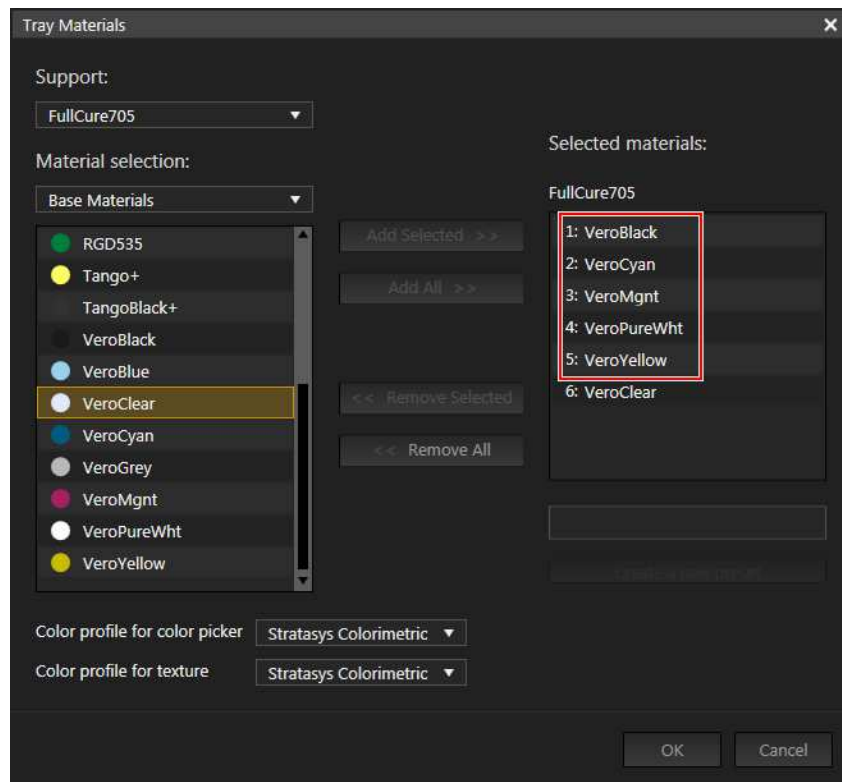


Figure 5-18 *Tray Materials* selection window

In addition to these materials, adding VeroClear enables you to adjust the opacity (translucence) of the color in the printed model (see below).

3. In the *Model Properties* panel, select Color Picker from the *Filter by* dropdown list.

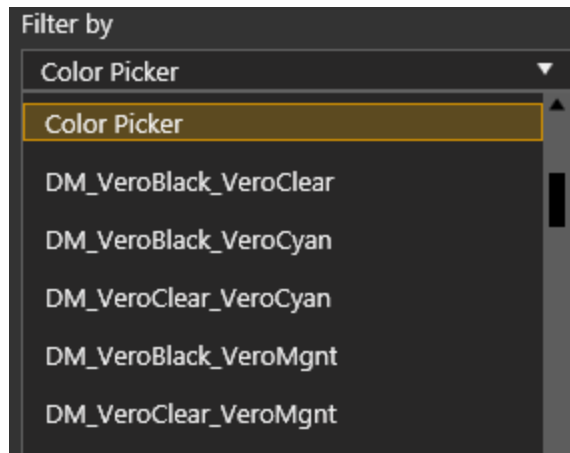


Figure 5-19 *Filter By* dropdown list
The Color Picker appears.

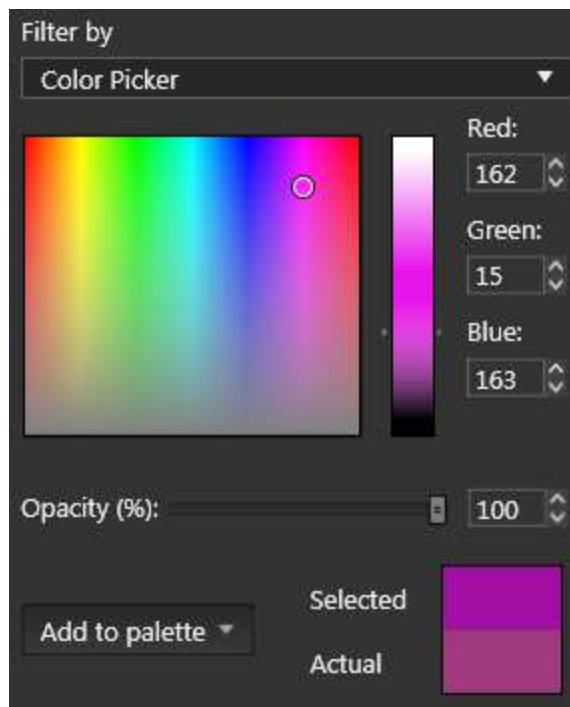


Figure 5-20 Color Picker

4. Click in the Color Picker and use the mouse to select a color.
 - The selected object on the build tray changes color.
 - The *Red*, *Green*, and *Blue* fields update to show the new RGB values.
 - You can enter exact RGB values, if required.
 - If VeroClear material is available, you can adjust the opacity (translucence) of the color applied to the model.
 - The *Selected* and *Actual* color swatches change to show the selected color and the result in the printed model.



The "actual color" is the closest color to the selected color that can be printed.

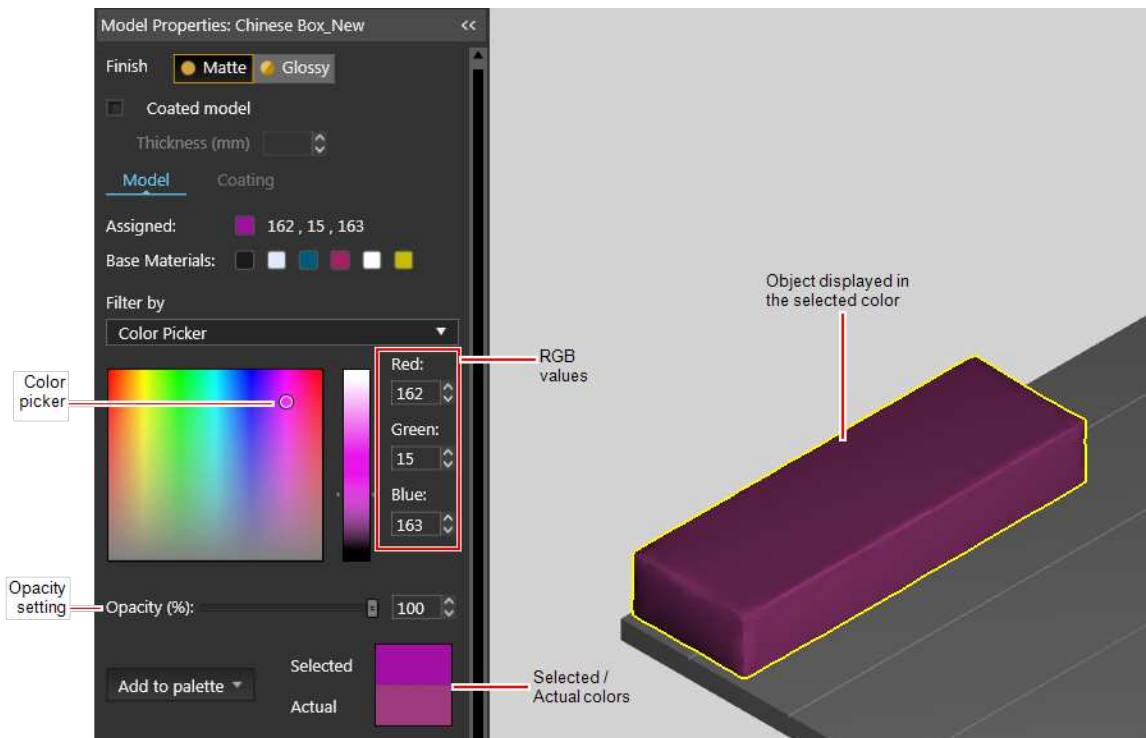


Figure 5-21 Color picker result



You can save the new custom color (material combination) and often-used base materials and digital materials in custom palettes (see below).

Custom Material Palettes

You can keep a collection of often-used base materials, digital materials and custom colors (material combinations) in custom palettes. This allows you to easily apply them when preparing models for printing.

To create or edit a custom material palette:

1. Select an object on the build tray.
2. In the *Model Properties* panel, select a material—a base material or a digital material—or set a custom color.

You can set a custom color with the Color Picker or with the Red/Green/Blue controls.

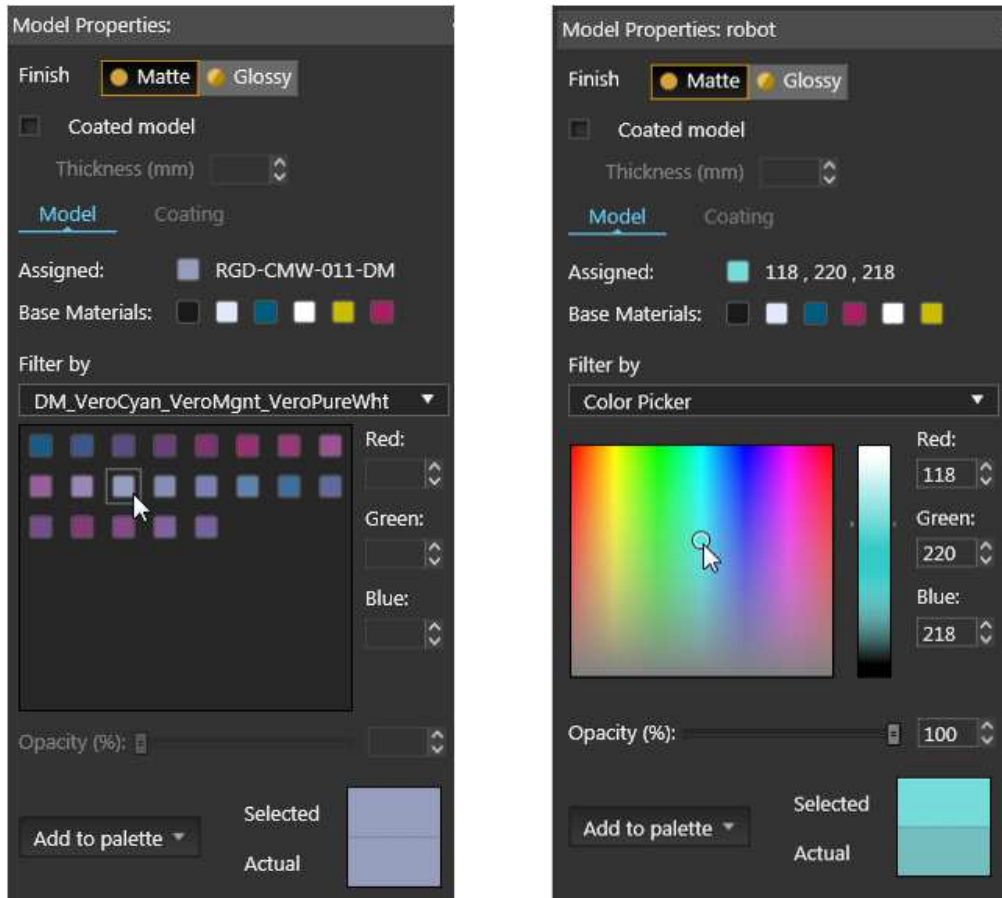


Figure 5-22 Selecting a material or color

3. Click Add to palette.
The *Custom Palette* dialog box opens.

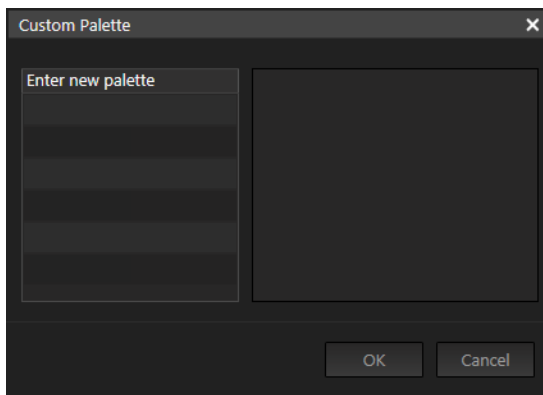


Figure 5-23 *Custom Palette* dialog box

4. When creating a palette, click Enter new palette, type a name and click OK.
The dialog box closes, and the new palette, with the selected material/color, is added to the *Filter by* list.
5. When adding the selected material to an existing palette, click the palette name and click OK.
The dialog box closes, and the selected material is added to the palette.


Surface Finish Models can be printed with a matte or glossy surface finish. To create a matte finish, the printer surrounds models with a thin layer of support material.


To set the model finish:

1. Select the model.
2. In the *Model Properties* panel, click Matte or Glossy.



Figure 5-24 Matte and Glossy model finish selection

When you select Glossy, an icon with a "glossy" symbol appears next to the object in the *Tray Explorer* in the assigned color .

When you select Matte, a matte icon (no glossy symbol) appears next to the object in the *Tray Explorer* in the assigned color .

Coating Objects

You can print composite models where the surface layer is a different material than the inside. This can be useful to achieve unique mechanical and textural characteristics. This technique is called “coating.”



Digital ABS material cannot be applied as a coating.

Coating cannot be applied to—

- VRML files
- hollow models
- objects when Digital ABS material is selected

To coat an object with a Model material:

1. Select the object on the build tray.
2. In the *Model Properties* panel, select the *Coated model* check box.

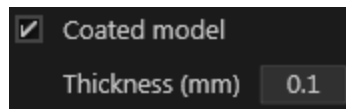


Figure 5-25 Coated model check box

3. In the *Thickness* field, enter a coating thickness between 0.1 and 1 millimeter.

Note: The coating thickness does not affect the external dimensions of the object, which remain unchanged. The coating layer replaces part of the main model material.

4. Click Coating.




Figure 5-26 Material selection for *Coating*

5. Select a coating material.

Important:

- If there are two shells of a model that are coated, the same material must be used.
- When *Coating* is selected, the material selected in the *Model Properties* pane applies to the coating, not to the model. To set the model material and colors, click *Model*.
- You cannot use the color picker or set RGB values for the coating material.

When a coating material is applied to an object on the build tray, the icon in the *Tray Explorer* shows the coating color .

“Hollow”— Filling Models with Support Material

Many objects placed on the build tray are “solid.” This means that, when printed, the model will be completely filled with Model material. Often, especially with large objects, this is unnecessary. Instead, the model can be filled with Support material, which is less costly. It is also advisable to fill models with Support material when preparing them for investment casting, since this material burns off more quickly during the process of making the cast.

PolyJet Studio enables you to print objects on the build tray with an outer shell of model material and a center filled with Support material.

Important: When using this feature, called “Hollow,” the thickness of the shell should be no less than 0.28 millimeters.

To use the Hollow feature:

1. Select a model on the build tray.
2. In the *Advanced Properties* section of the *Model Properties* panel, select *Hollow*.

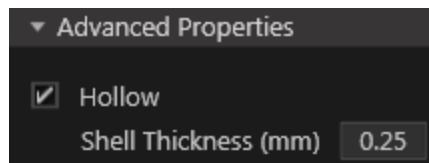


Figure 5-27 Hollow selection

3. Set the shell thickness (in millimeters).



Note: There is no change in the display of objects in PolyJet Studio when *Hollow* is selected.





A model cannot be both hollow and coated (see “Coating Objects” on the previous page).

Assigning Properties to Hidden Objects

To enable you to assign materials and other properties to parts of objects that are hidden from view on the build tray, you can temporarily turn off the display of some objects.

- When an object is displayed,  appears next to its name in the *Tray Explorer*.
- When an object is hidden,  appears next to its name in the *Tray Explorer*.

To display or hide an object on the build tray:

- In the *Tray Explorer*, click  or  to display or hide the object on the build tray.

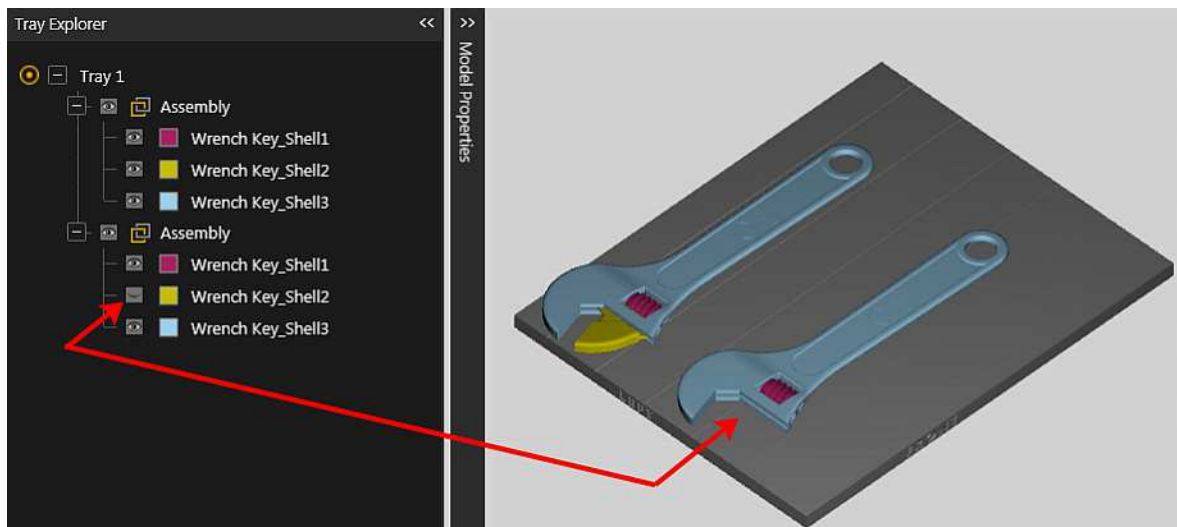


Figure 5-28 Hidden object on the build tray

Preparing VRML files for Printing

VRML files contain color information. After placing a VRML file on the build tray, PolyJet Studio assigns each shell a digital material that provides the best color match. Therefore, the color selection options in the *Model Properties* pane are disabled.

You can apply a matte or glossy finish to VRML models, and you can resize them.

1. Make sure that all of the following materials are selected:
 - VeroCyan
 - VeroMagenta
 - VeroYellow
 - VeroBlack
 - VeroPureWhite



You can select up to six materials, but when printing VRML files, only the materials mentioned above will be used.

2. To optimize placement of the model(s) on the tray, click **Placement** (see "Automatic Positioning" on page 5-26).
3. To ensure that the tray meets all requirements, click **Validate** (see "Tray Validation" on page 5-35).
4. To estimate the printing time and amount of material for this print job, click **Estimate** (see "Production Estimates" on page 5-36).

Opening Tray Files

You can open trays that were saved as *objtf* files (see "Saving Trays " on page 5-39).



The *objtf* file contains instructions for printing—which files to print and their position on the build tray. Because the *objtf* file references the *stl* and *vrml* files used, they must remain in the same file location as when the *objtf* file was saved.

To place an object saved as a tray file (*objtf*) on the build tray:

1. From the *File* tab, click *Open* and select *Open Tray*.

The *Open* dialog box appears.

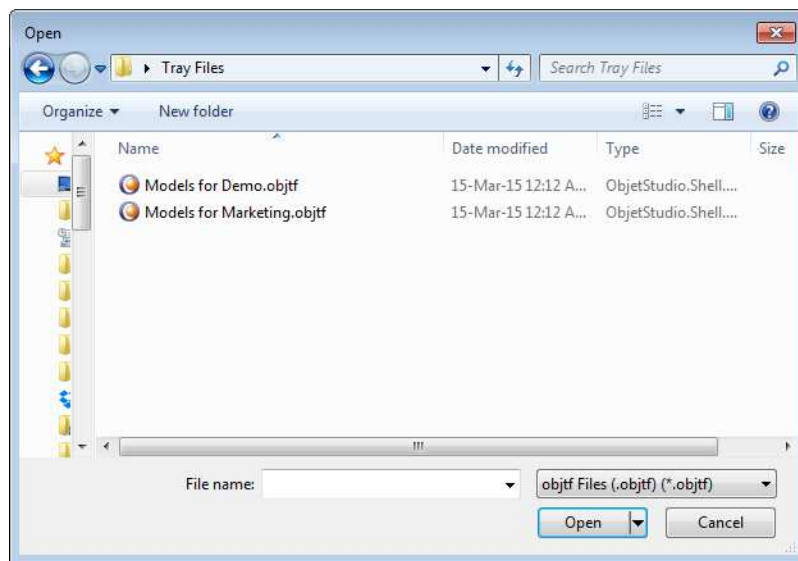


Figure 5-29 The *Open* dialog box

2. Select the desired file, and make sure that it appears in the *File name* field.
3. Click *Open*.

The *Select Printer* dialog box appears.

PolyJet Studio opens the tray file.

Opening Packed Tray Files (*objzf*)

All *objzf* files are compressed files containing the *objtf* tray file and the referenced model files (see "Saving Trays " on page 5-39).

To use trays saved as *objzf* files, the file must first be unpacked in PolyJet Studio and its component files saved.

Note: If you pack an *objzf* file containing an *stl* file originally saved as read-only, you cannot unpack this *objzf* file to the folder where the read-only *stl* file is saved.



Unpacking an *objzf* file creates a new build tray.

To unpack and open an *objzf* file:

1. On the *File* tab, click Open > Unpack Tray.

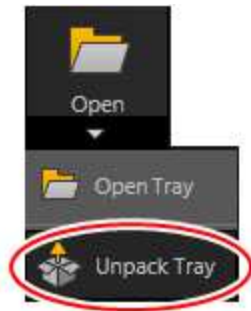


Figure 5-30 Unpack Tray opens an *objzf* file

2. In the *Open* dialog box, display the appropriate folder and select the file.
3. Click OK.
4. In the *Browse For Folder* window, navigate to the location where you want to extract the *objzf* file and click OK.

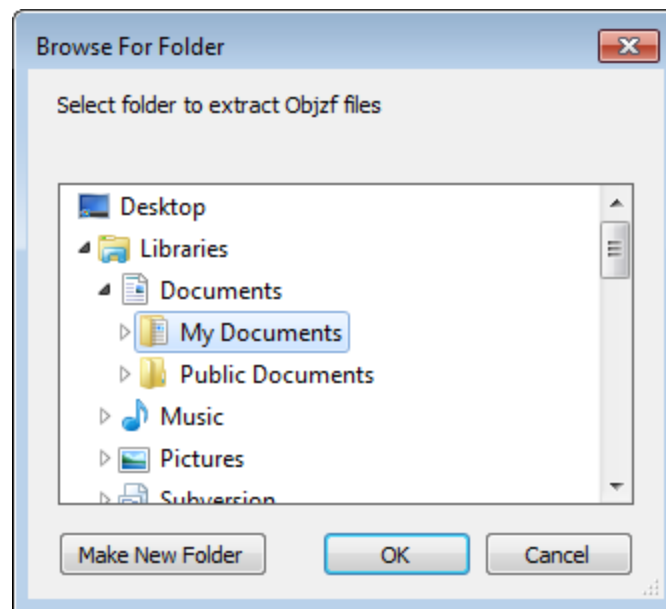


Figure 5-31 Browse for Folder window

5. In the *Select Printer* dialog box (see below) connect to a printer or select Work Offline and click OK.

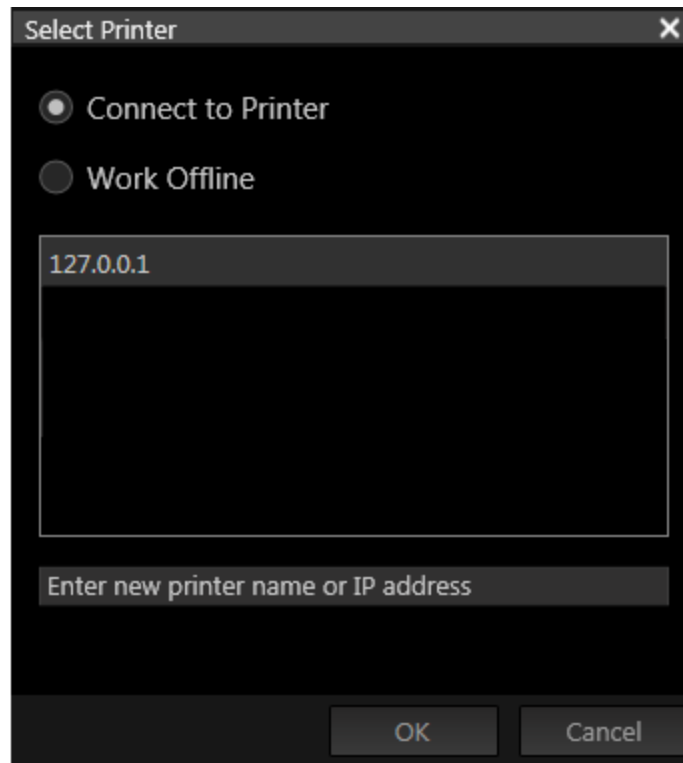


Figure 5-32 *Select Printer* dialog box (sample)

- Connect to Printer

A printer can be listed by its name or by its computer's IP address. To add a printer, click in the place indicated and enter its identifier.

- Work Offline

Select a printer type so you can prepare trays that are suitable for the relevant tray size and printer features .

PolyJet Studio opens the file.

Positioning Objects on the Build Tray

To produce models efficiently and with the required finish, it is important to carefully position objects on the tray. You should check to make sure that the objects are orientated optimally for your needs, according to the considerations explained in "Manual Positioning" on page 5-27.

Two things that affect the positioning of objects on the tray are *orientation* and *placement*. You can let PolyJet Studio determine the optimum orientation and position, or you can control them.


Automatic Positioning

After placing several objects on the build tray, you can let PolyJet Studio arrange them before printing. This ensures that the objects are positioned properly, and that they will be printed in the shortest time.



Automatic positioning will not work if the Rotate values are locked. See "Setting Model Dimensions" on page 5-29.

To automatically arrange objects on the build tray:

- From the *Home* tab, in the *Job* group, click  *Placement*.

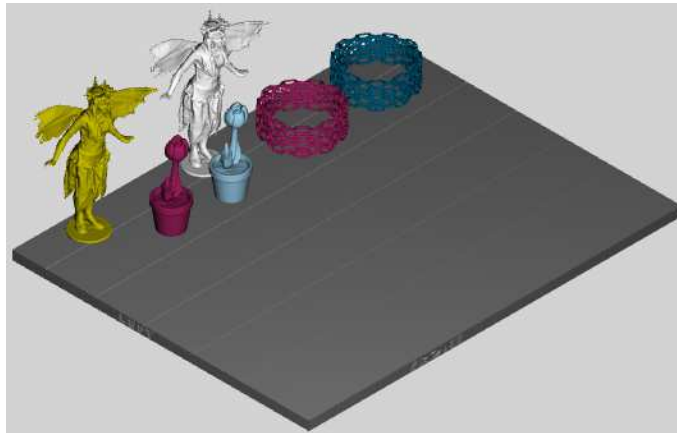


Figure 5-33 Build tray before clicking Placement

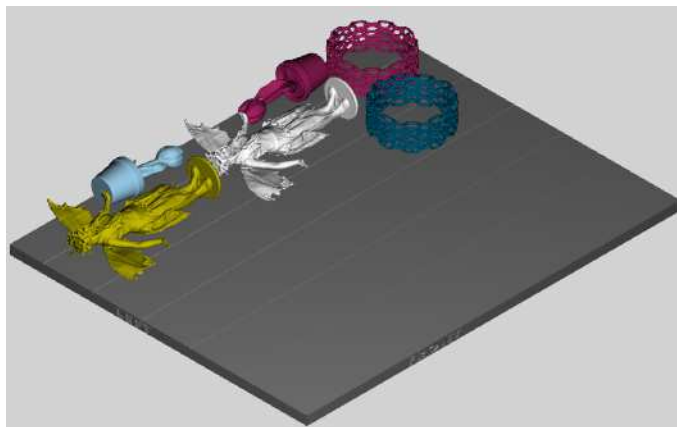


Figure 5-34 Build tray after clicking Placement



- The physical characteristics of each type of Model material you use can affect the positioning of objects on the build tray. Therefore, select materials **before** clicking the *Placement* button.
- The first priority used by automatic placement is printing quality. Therefore, to optimize quality, some parts might be placed diagonally, which takes much longer to print.

Manual Positioning

You can change the position of objects on the build tray—even if they were arranged with the *Placement* option.

The orientation of models on the build tray affects how quickly and efficiently they will be produced by the printer, where and how much Support material is used, and whether or not model parts will have a glossy finish. Therefore, you should consider a variety of factors when deciding how to place models on the build tray, using the following positioning rules.

X-Y-Z Rule

This rule considers a model's outer dimensions.

- Since the print heads move back and forth along the X-axis, the printing time along this axis is relatively short, compared to printing time along the Y-axis and Z-axis. From this point of view, it is advisable to place the object's *largest* dimension along the X-axis.
- Any surfaces that come into contact with Support materials become matte.
- Since models are built up, on the Z-axis, in 16- or 30-micron layers (according to the printing mode), it is very time-consuming to print a tall object. From this point of view, it is advisable to place the object's *smallest* dimension along the Z-axis.
- Since the print heads measure about 2 inches (5 centimeters) on the Y-axis, models measuring less than this (on the Y-axis) are printed in one pass. From this point of view, it is advisable to place the object's *intermediate* dimension along the Y-axis.

Tall-Left Rule

This rule considers models where, after being orientated on the build tray according to other considerations, one side is taller than the other.

- Since the print heads move along the X-axis from left to right, taller sections on the right require the print heads to scan unnecessarily from the left until reaching them. If, on the other hand, the taller sections are positioned on the left of the build tray, the print heads only have to scan the model until printing these sections—once the lower parts have been completed. Therefore, you should position the taller side of the model, when possible, *on the left*.



The following rules are based on the fact that Support material is not required on the top of the printed model.

Recess-Up Rule

This rule considers models containing surface recesses.

- Recesses in the surface (like hollows, drill holes, etc.) should, when possible, be positioned *face-up*.

Fine-Surface Rule

This rule considers models that have one side on which there are fine details (like the keypad side of a telephone).

- The side of the model containing fine details should, when possible, be positioned *face-up*. This results in a smooth finish.

Avoid Support-Material Rule

This rule considers models that have large holes or hollows, open on at least one side (like a pipe or a container).

- It may be advantageous to print a model *standing up*, so Support material does not fill the hollow, even though printing the model lying down would be much faster.

Manipulating Objects on the Tray

Setting Model Dimensions

The *Dimensions* section of the *Model Properties* panel enables you to make fine adjustments to objects on the build tray along the X, Y, and Z axes. After changing a value, click in another field in the *Dimensions* group to apply the new setting.

Rotate—You can rotate an object by entering the required values in the *Rotate* fields. Click the lock button to lock the *Rotate* fields. This prevents automatic placement from changing the rotation of the object on the build tray.



The X, Y, and Z dimensions are retained from the original part design and are not changed when you re-orient the model.

Move—You can move the object to a specific position on the build tray by adjusting the values in the *Move* fields.

Resize—You can change an object's dimensions by adjusting the values in the *Dimensions* fields.

Scale—You can change the scale of an object by adjusting the values in the *Scale* fields. If *Uniform Scale* is enabled, changing the object's dimension on one axis affects the other dimensions, proportionately.

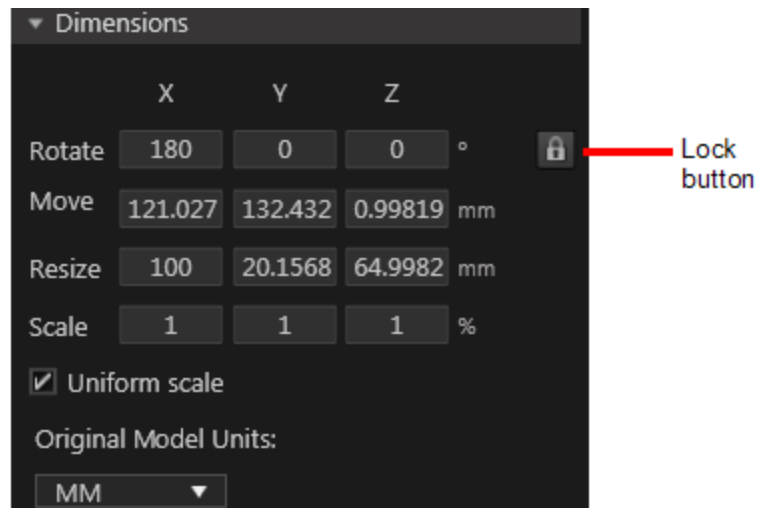


Figure 5-35 Dimensions section of the *Model Properties* panel

Manually Repositioning Objects

You can change the position of objects on the build tray. Considerations for positioning objects are presented in "Manual Positioning" on page 5-27.

To manually reposition an object:

1. Select an object by clicking it on the build tray, or selecting it in the *Tray Explorer*.

A frame appears around the object.

2. Click and drag the object to move it on the build tray.

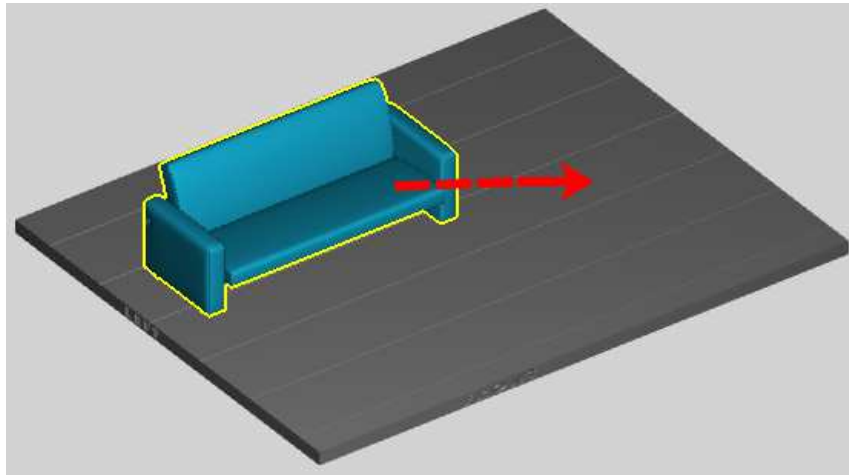



Figure 5-36 Moving an object on the build tray

Re-aligning Objects

To re-align an object:

1. Select an object on the build tray.

2. Display the *Home* ribbon and click **Align to Plane** .

3. Click on the plane of the object you wish to re-align.

The plane-alignment toolbar is displayed for the selected plane.

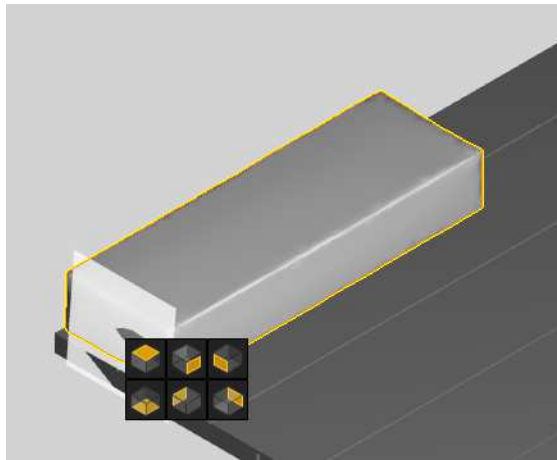


Figure 5-37 Align to Plane

4. Select one of the icons to re-align that plane of the object.

Display Options

Viewing Objects

From the *View* tab, you can change the way objects are displayed. The default method for displaying models on the build tray is as solid objects.

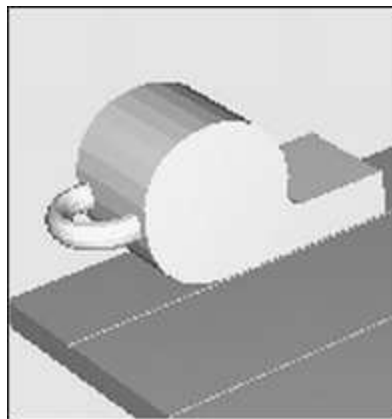


Figure 5-38 Build tray and model displayed in *Shaded* view

The other display option is *Wireframe*.

To display models on the build tray in *Wireframe* view:

- From the *View* tab, in the *Model Display* group, click *Geometry* and select *Wireframe*.



Figure 5-39 Build tray and model displayed in *WireFrame* view

To revert to the *solid* view:

- From the *View* tab, in the *Model Display* group, click *Geometry* and select *Solid*.

To display the maximum build height:

- From the *View* tab, in the *Tray Display* group, select *Display 3D Box*.

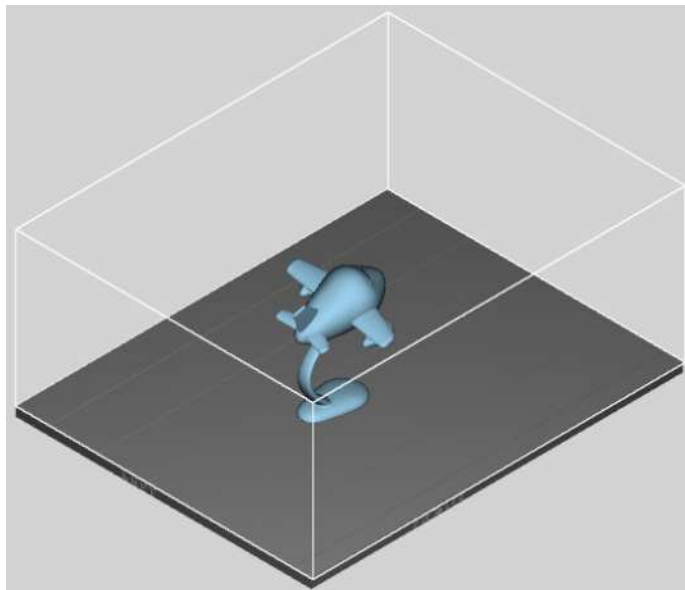


Figure 5-40 3D box view

Tray Perspective

The default perspective of the build tray is “Left Front.” You can change the perspective of the active window with one of ten options.

To change the perspective of the build tray display:

1. On the *Home* tab, in the *Tray View* section, click *Isometric*.

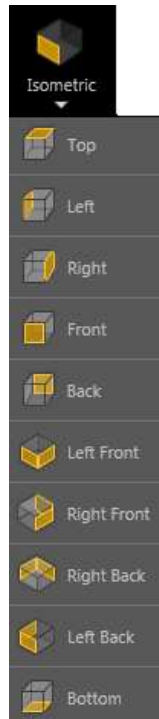


Figure 5-41 *Isometric* menu

2. Click the option that represents the desired perspective.

Tray Positioning

To change the position of the build tray on the screen:

- Hold down the `Shift` key and the left mouse button while moving the mouse.

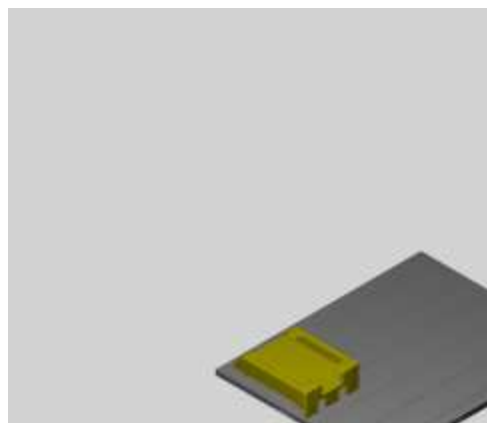


Figure 5-42 Build tray after moving it

To manually rotate the build tray:

- Hold down the right mouse button while moving the mouse.

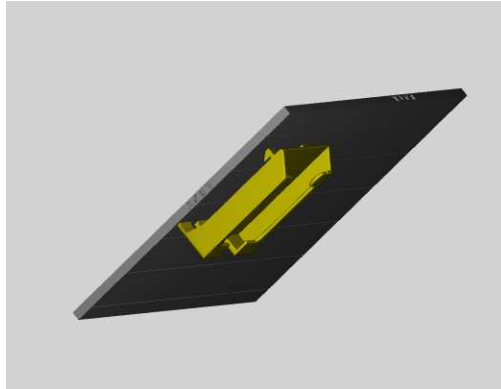


Figure 5-43 Build tray after rotating it

To reset the build tray position, select one of the options from the *Isometric* menu.

Zooming

While manipulating objects, you often need to view them at different zoom levels.

To change the zoom level:

- Scroll the mouse wheel forward (to zoom in) or backward (to zoom out).

Handling Trays


After preparing models on the build tray, you can do the following:

- Test that it can be printed ("validation").
- Calculate the time and material resources needed to print it.
- Send it to the printer for production.
- Save it for later completion or printing.
- Save it as a compressed file for convenient storage and transfer.

Tray Validation Before sending a job to the printer for production, you should check that the tray is “valid” and can be printed.

Note: Because of the unique characteristics of each type of model material, make sure that the correct material is selected *before* performing Tray Validation.

To validate that the tray can be printed:

- On the *Home* tab (in the *Job* group) click . If the tray is not valid for printing, an error message appears, and the problematic model is surrounded by a red box.

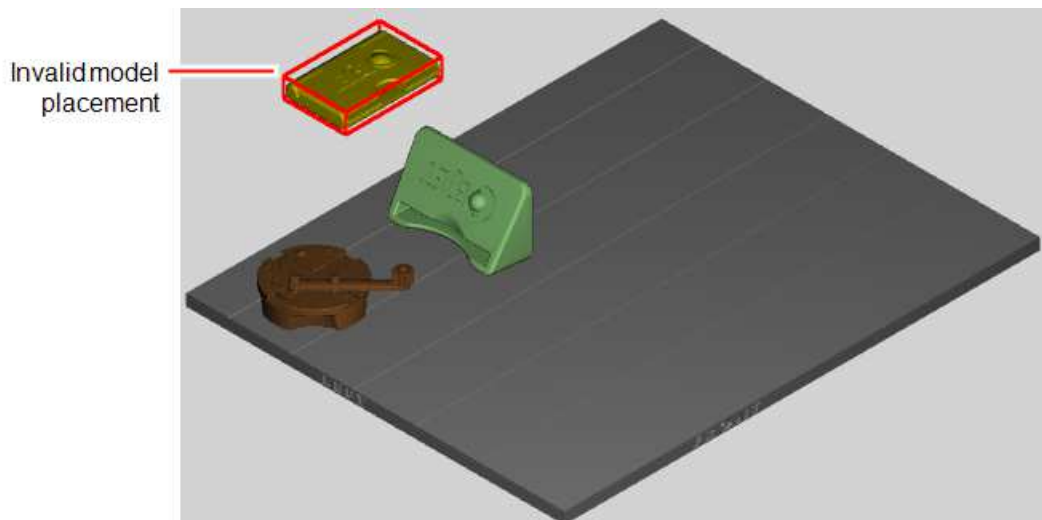


Figure 5-44 Invalid build tray




Even if more than one model is the cause of an invalid tray, only one model at a time is surrounded by a red box. When you fix the placement of the model indicated, validate the tray again to make sure that the tray is now suitable for printing.

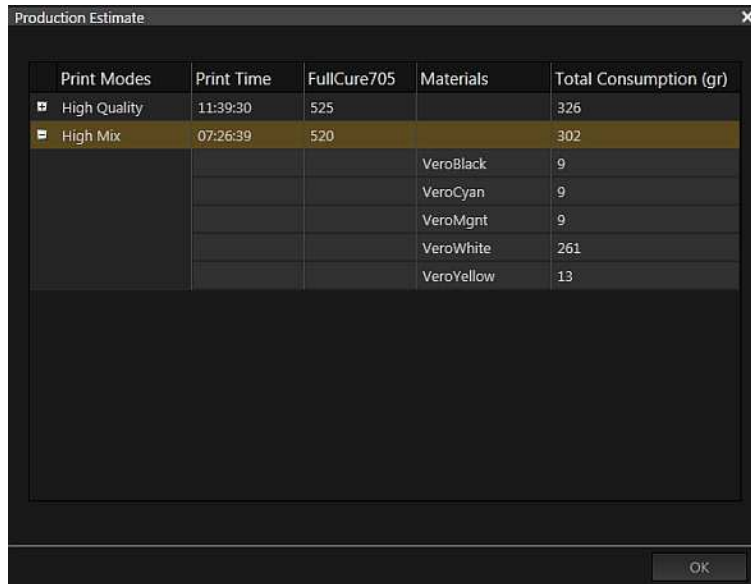
Production Estimates

PolyJet Studio enables you to calculate the time and material resources needed for producing trays before sending them to the printer. The time it takes PolyJet Studio to perform this calculation depends on the number of objects on the tray and their complexity. Calculating the production estimate for a full tray could take up to 15 minutes, depending on your computer’s specifications.

To calculate the time and materials needed for producing the current tray:

- On the *Home* tab, in the *Job* group, click .



When PolyJet Studio finishes calculating the production resources, the results are displayed in a dialog box.



The screenshot shows a 'Production Estimate' dialog box with a table of results. The table has five columns: Print Modes, Print Time, FullCure705, Materials, and Total Consumption (gr). Two rows are expanded: 'High Quality' and 'High Mix'. The 'High Mix' row is highlighted. Below the table, there is a list of materials and their consumption in grams.

| Print Modes | Print Time | FullCure705 | Materials | Total Consumption (gr) |
|--------------|------------|-------------|------------|------------------------|
| High Quality | 11:39:30 | 525 | | 326 |
| High Mix | 07:26:39 | 520 | | 302 |
| | | | VeroBlack | 9 |
| | | | VeroCyan | 9 |
| | | | VeroMgnt | 9 |
| | | | VeroWhite | 261 |
| | | | VeroYellow | 13 |


Figure 5-45 *Production Estimate* screen

Click  and  to expand and collapse the Print Modes to reveal the estimated consumption of every Model and Support material needed to print the tray.

The estimated material consumption is displayed in grams.

Printing the Tray

To print the tray:

1. On the *Home* tab (in the *Job* group) click . The *Build* dialog box opens.

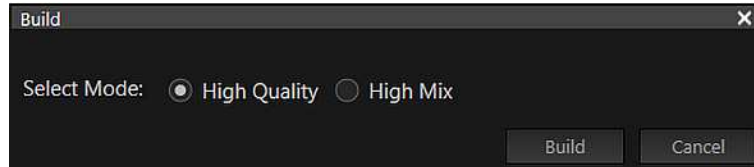


Figure 5-46 *Build* dialog box

2. Select the printing mode and click *Build*.



For an explanation of printing modes, see "Printing-Modes" on the next page.

The *Save As* dialog box opens.

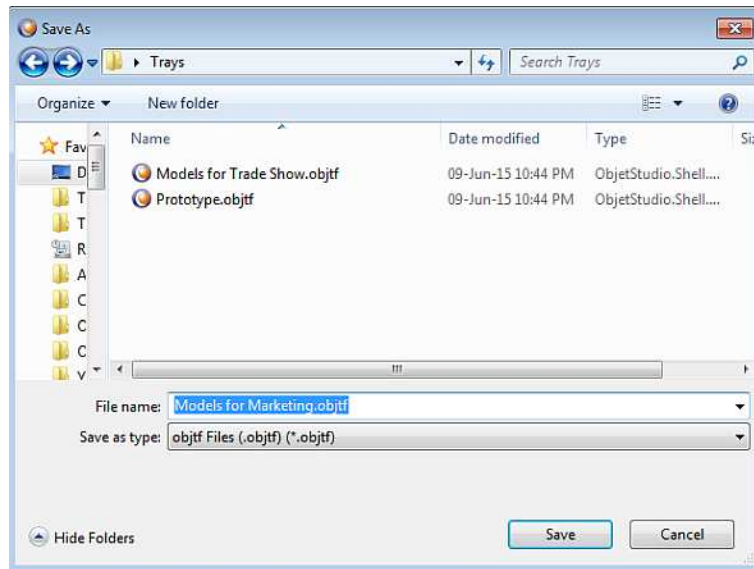


Figure 5-47 *Save As* dialog box

3. In the *Save As* dialog box, save the tray.

The *Manager* screen opens and the model is placed in the job queue.

When a tray is ready to be printed, it is placed in the Printing Queue. When the job reaches the head of the queue, PolyJet Studio pre-processes the tray file to create slices, and feeds them to the printer.

Printing-Modes When printing the tray file, the *Build* dialog box opens in which you need to select the appropriate printing mode. (See "Printing the Tray" on the previous page.)

High-Speed Mode

Models are produced in 27-micron layers, using up to three Model materials. This mode is suitable for producing larger models.

Much less time is required to print most trays, compared to the High Quality setting.

High-Mix Mode

Models are printed in 27-micron layers, using up to six Model materials. This mode is suitable for producing larger models.

Printing models in this mode is faster than in High Quality mode, but not as fast as in High-Speed mode.

High-Quality Mode

Models are printed in 14-micron layers, using up to six Model materials. This results in smooth surfaces, suitable for producing fine-detailed and delicate items.

Almost twice as much time is required to print most trays, compared to the High Speed setting.

Saving Trays

After preparing a build tray in PolyJet Studio, you can save it as a tray file (*.objtf). This file contains all of the information about the build tray—which model files to print, their properties, and their position on the build tray. Saving a tray file is useful for finishing or printing the tray at a later time.



Because the *objtf* file references the *stl* and *vrmf* files used on the tray, do not move them; they must remain in the file locations where they were when the *objtf* file was saved.

You can also save a tray as a "packed" file (*.objzf), which contains the tray file and all of the model files in one compressed file. This is convenient for backing up, storing and transferring tray files.

To save a tray file (*.objtf):

- Display the *File* tab and click **Save**.



Figure 5-48 Save button

- If the tray was not saved previously, the *Save As* dialog box appears. Enter a file name and click **Save**.
- If the tray was saved previously, the current tray overwrites the previous one.

To save a saved tray with a different file name (*.objtf):

1. Display the *File* tab and click the arrow under the *Save* icon.
2. In the drop-down menu, click **Save Tray As**.

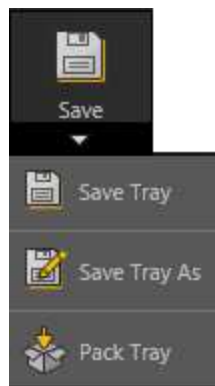


Figure 5-49 Save menu

The *Save As* dialog box appears.

3. Enter a file name and click **Save**.

To save the tray and all associated files as a compressed file (*.objzf):

1. Display the *File* tab and click the arrow under the *Save* button.
2. In the drop-down menu, click *Pack Tray*.

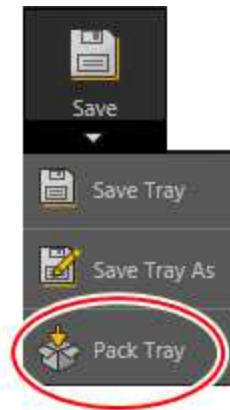


Figure 5-50 Compressing the contents of a tray file
The *Save As* dialog box appears.

3. Enter a file name and click *Save*.

Opening a New Build Tray You can open a new instance of the build tray without closing the build tray that is currently displayed. After doing so, however, you need to close it to return to the previous build tray.

To display a new build tray:

1. From the *File* tab, click **New**.
The *Select Printer* dialog box opens.
2. Select a printer or select **Work Offline** and click **OK**.



Figure 5-51 *Select Printer* dialog box (sample)

- **Connect to Printer**
A printer can be listed by its name or by its computer's IP address. To add a printer, click in the place indicated and enter its identifier.
- **Work Offline**
Select a printer type so you can prepare trays that are suitable for the relevant tray size and printer features.

An empty build tray appears.

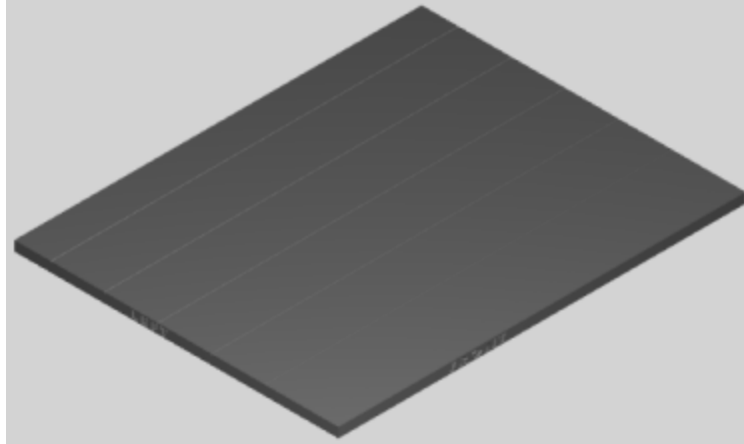


Figure 5-52 New build tray

3. Place an object on the build tray (see "Placing Objects on the Build Tray" on page 5-7).

Monitoring and Managing Print Jobs

You manage print jobs sent to the printer in the *Manager* screen. Display this screen by clicking the *Manager* tab at the top of the PolyJet Studio window



Manager Screen

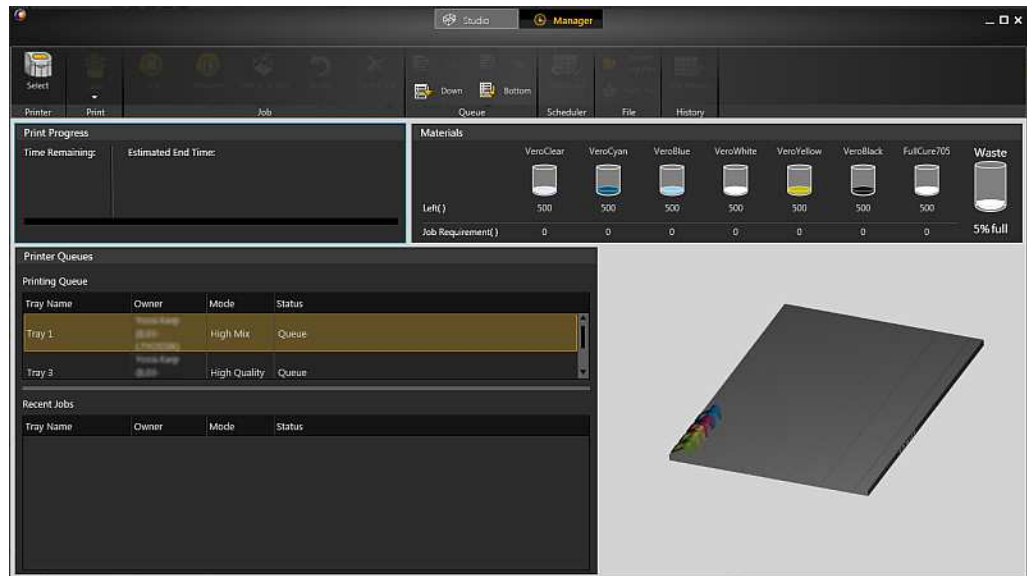


Figure 5-53 *Manager* screen

The *Manager* screen includes the following sections for monitoring print jobs:

- [Printing Queue](#)
- [Print Progress](#)
- [Recent Jobs](#)
- [Materials](#)
- [Tray Preview](#)

Printing Queue The *Printing Queue* displays information for each of the queued jobs:

- *Tray Name*—the tray (objtf file) sent for printing
- *Owner*—the computer that sent the job
- *Mode*—the print mode used for the job
- *Status*—the status of the job (*Ready, Completed...*)

| Printing Queue | | | |
|----------------|-----------|------------------------------------|-------------------|
| | Tray Name | Owner | Status |
| + | Tray 1 | Training_bt_cs (IL03-TESTTRAIN) | High Mix Ready |

Figure 5-54 Job in Printing Queue

To see more job details, click the "+" expansion icon.

| Printing Queue | | | | | | |
|----------------|-----------------------|-------------------|------------------------------------|-------------------|----------------------|--------------------|
| | Tray Name | | Owner | Mode | Status | |
| + | Tray 1 | | Training_bt_cs (IL03-TESTTRAIN) | High Mix | Ready | |
| | VeroPureWht 620 gr | VeroCyan 32 gr | VeroBlack 32 gr | VeroMgnt 32 gr | VeroYellow 144 gr | VeroClear 32 gr |
| | FullCure705 444 gr | | | | | |
| | Queue: 17:47 28-01 | | | | | |
| | Ready: 07:25 29-01 | | | | | |

Figure 5-55 Job Details in Printing Queue

Printing Progress The *Print Progress* section displays the following information:

- time remaining to finish printing
- estimated time when printing will end
- number of slices printed and the total number of slices
- progress bar
- job start time

| Print Progress | |
|-----------------------------|---------------------|
| Time Remaining: | Estimated end time: |
| 0d 0:37:41 | 12:03 31-03 |
| Slice Printed: 2428 of 2782 | Printing 87% |
| Job Started: 11:14 31-03 | |

Figure 5-56 *Print Progress*

Recent Jobs The *Recent Jobs* section displays information about previous jobs and their final status.

| Recent Jobs | | | |
|---|---------------------------------|----------|-----------|
| Tray Name | Owner | Mode | Status |
| Tray 1 | (IL03-TESTTRAIN) | High Mix | Error |
| Tray 6 | Training_bt_cs (IL03-TESTTRAIN) | High Mix | Error |
| Liver_mm | Uri.Mann (IL01-CHTTBW1) | High Mix | Completed |
| Queue: 15:47 12-01 Ready: 15:49 12-01 Print: 15:50 12-01 Finish: 23:07 12-01 | | | |
| Liver_mm | Uri.Mann (IL01-CHTTBW1) | High Mix | Stopped |

Figure 5-57 *Recent Jobs*

To see more job details, click the "+" expansion icon.

Available Materials The *Materials* section displays the amount of available printing materials remaining in the printer and the amount of waste in the waste container.

The *Job Requirement* values indicate the amount of printing materials required for the current job.

| Materials | FullCure705 | VeroYellow | VeroMgnt | VeroCyan | VeroPureWht | VeroBlack | VeroClear | FullCure705 | Waste |
|----------------------|-------------|------------|----------|----------|-------------|-----------|-----------|-------------|-------|
| Left (gr) | 600 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | Full |
| Job Requirement (gr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |

Figure 5-58 *Materials* panel in the *Manager* screen

Tray Preview The *Tray Preview* displays the tray view of the job selected in the *Printing Queue* or the *Recent Jobs* section.

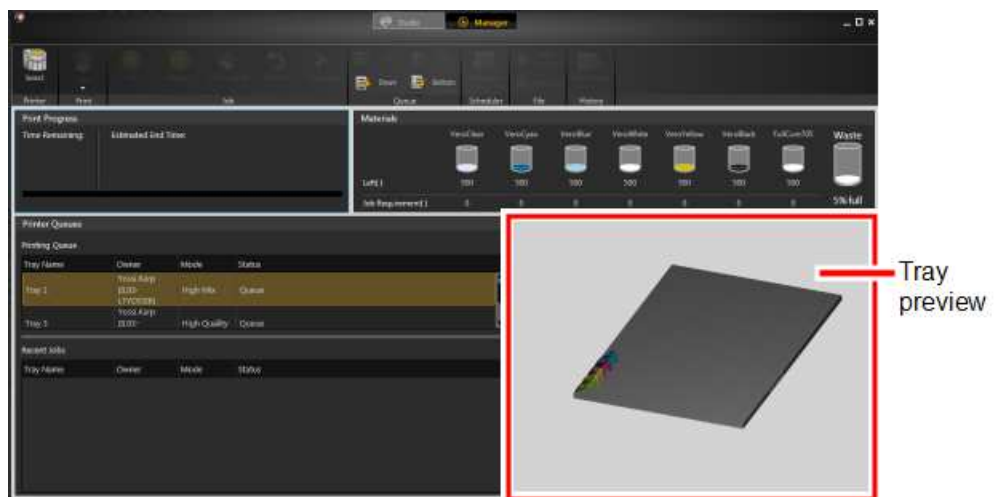



Figure 5-59 Tray preview

Setting the Printer Connection

You may need to set (or reset) the connection between a client PC and the PolyJet Studio server, or between the PolyJet Studio server and the printer-control program.

To set the printer connection:

1. Click .
2. In the *Select Printer* dialog box, make sure that *Connect to Printer* is selected.
3. Select a printer from the list and click OK.

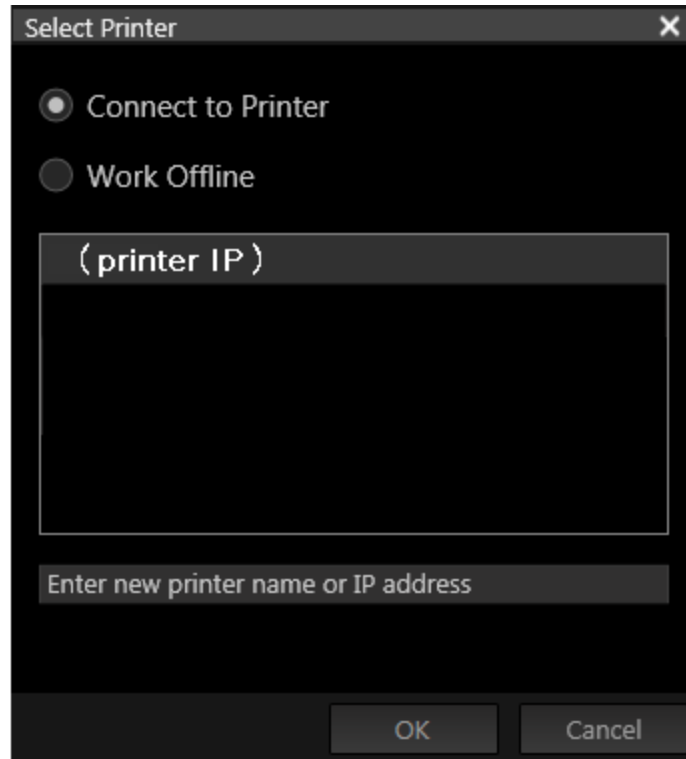


Figure 5-60 *Select Printer* dialog box (sample)





Note: A printer can be listed by its name or by its computer's IP address.

To add a printer:

- Click in the place indicated and enter its identifier.

Job Commands

The following operations are available on the *Manager* screen:

| Icon | Purpose |
|---|---|
|  Restart | <ul style="list-style-type: none"> For a job selected in the <i>Printing Queue</i>—Prints it again (from the beginning). For a job in the <i>Recent Jobs</i> list—a new job, identical to the selected job, is created. |
|  Stop | Stops a job in progress. |
|  Resume | Continues printing the current job. (You enter the slice from which to resume printing.) |
|  Delete job | Moves the selected job from the <i>Printing Queue</i> to the <i>Recent Jobs</i> list, where its status is "Aborted." |

Printing Jobs from the Printing Queue

If there is a job in the Printing Queue, it is sent automatically to the printer—as long as it is turned on, there is a connection to it, and it is in "on line" mode.

Chapter 6 describes starting and operating the printer.

Resuming Jobs

If the printing process is stopped or interrupted, you may be able to continue printing the job. You need to enter the slice from which to resume printing.



Caution:

If you want to resume the job from slice 0, the printer raises the build tray. If you have a partially printed model on the build tray this could cause damage to the printer.

If you want to print from slice 0, do not resume the job, restart it, instead. See "Restarting Jobs" on the next page.

To resume printing:

1. Select the job.



2. Click **Resume**.

3. If the print job was stopped and then resumed, the next slice appears in the *Resume From Slice* dialog box. Click OK.
4. If the print job is resumed after a failure, enter the slice from which to resume printing and click OK.

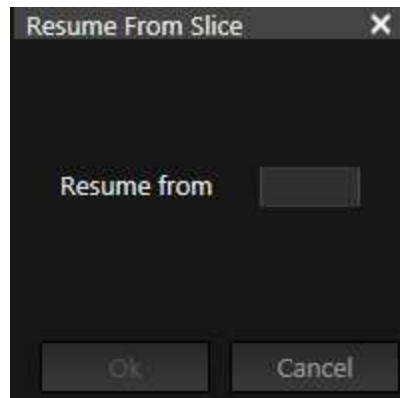


Figure 5-61 *Resume From Slice* dialog box

Restarting Jobs

When you restart a print job, PolyJet Studio assumes that the printer tray is clear. The printer raises the build tray to the start position and PolyJet Studio sends data from slice 1.

You can restart jobs from the *Recent Jobs* list or from the *Printing Queue*.

To restart a job:

1. Select a job.



2. Click **Restart**.

6

Operating and Maintaining the Stratasys J750 3D Printer

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Figure 6-1 The Stratasys J750 3D Printer

Starting the Printer



Caution

- Do not attempt to operate the printer before being trained by a Stratasys Customer Support representative.
- Observe all safety warnings and follow the safety guidelines described in Chapter 2.

1. Turn on the main power switch, located at the back of the printer.



Figure 6-2 Main power switch and cable

2. After the printer-control computer boots, log in to Windows and launch the printer-control program:



A HASP plug containing a valid product activation key is required on the printer computer. This is installed at the factory or during printer upgrade. If the application does not open and a HASP message appears, contact your dealer or Stratasys Customer Support.

All monitoring and controlling of the printer is done from this interface.

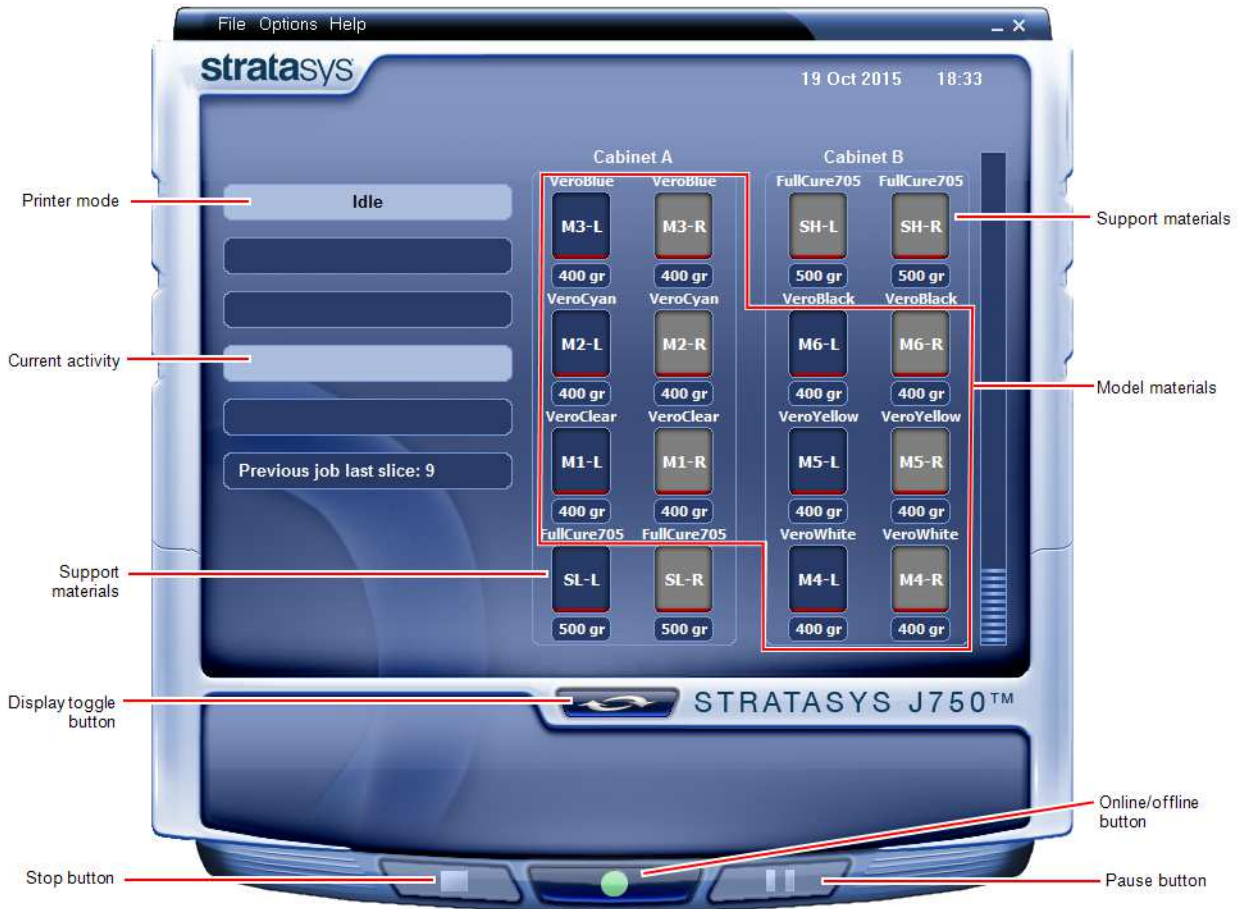


Figure 6-3 Stratasys J750 interface

Loading Model and Support Cartridges

J750 printers use up to 12 cartridges of Model material and up to four cartridges of Support material, each weighing 3.6 kilograms when full. A graphical representation of the cartridges loaded and their current weight appears in the printer interface (see Figure 6-3 on the previous page).



The material cabinet contains cartridges of printing material. For this purpose, an RFID module is built into the cabinet. Tampering with this module will render the printer inoperable and may void Stratasys warranties and service contracts.

Important: If you need to replace the Model material currently installed with another type, see "Changing the Printing Material" on page 6-14. Otherwise, make sure to replace the Model cartridge with one containing the same type of material.

To load Model and Support material:

1. Open the doors of the material cabinet.
2. Load Model and Support cartridges into their respective compartments. You should feel some resistance, as a needle pierces the cartridge.
3. Check the printer interface to make sure that the new cartridge is detected and that its weight is displayed (see Figure 6-3 on the previous page).
4. Close the material cabinet.

Tips about loading and replacing material cartridges:

- You can load partially used cartridges, provided that they contain more than 100 grams of material.
- You can replace material cartridges either before or during printing.
- If printing stops for an extended time before you replace a material cartridge, the printer may go into *Standby* or *Idle* mode. If this happens, see "Resuming Production After Printing has Stopped" on page 6-11.
- You can replace partially used cartridge to avoid the need for replacing them 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.

Producing Models

Models can be printed after they are arranged on a virtual build tray in a 3D printing application. Two such applications are available for preparing trays for printing on the J750 printer:

- PolyJet Studio
- GrabCAD Print

For information about preparing model files for printing, see the relevant documentation—

- "Using PolyJet Studio" in this user guide
- GrabCAD Print [online documentation](#).

Preparing the Printer



Before beginning to produce models, it is recommended that you check the current printing quality of the print heads by performing a pattern test (see "Pattern Test" on page 6-32).

To prepare the printer for producing models:

1. Make sure that the build tray in the printer is empty and clean. If not, remove cured material with the scraper, and clean the tray thoroughly with a wet cleaning cloth.



Caution

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

2. Make sure that there is sufficient Model and Support material loaded, as indicated on the printer interface (see Figure 6-3 on page 6-4). 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.

For installing material cartridges and replacing empty ones, see "Loading Model and Support Cartridges" on the previous page.

For changing the type of Model material currently loaded, see "Changing the Printing Material" on page 6-14.

3. On the printer interface, click the red button to switch the printer to *online* mode.

The color of the button changes from red to green (see Figure 6-4 on page 6-8). If there is a job in the printing queue, it is sent to the printer.

When switching the printer to online mode, a message is displayed if a maintenance activity is required to ensure optimum printing quality. (See "Routine Maintenance Schedule" on page 6-29.) Maintenance notifications can be disabled/enabled from the Options menu.

On the printer interface, the printer mode changes from *Idle* to *Pre-print*, as the printer's components prepare themselves for production:

- The print block is heated.
- The UV lamps are powered and they warm up.

When printing begins, the print manager program sends seven slices to the printer-control application. This is the standard buffer between the print manager and the printer. As each slice is printed, another slice is sent to the printer.

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 supply cartridges, printing proceeds automatically until the job is finished.

The J750 printer uses up to six different Model-material cartridges to produce models. In addition, two Support-material cartridge are required. If additional cartridges are installed and they are not needed for the current print job, the printer interface indicates which are being used:

- *Blue cartridge*—used for the print job
- *Gray cartridge*—not used for the print job

You can monitor printer status indicators by switching the printer interface display. To do this, click the display toggle button on the printer interface screen.

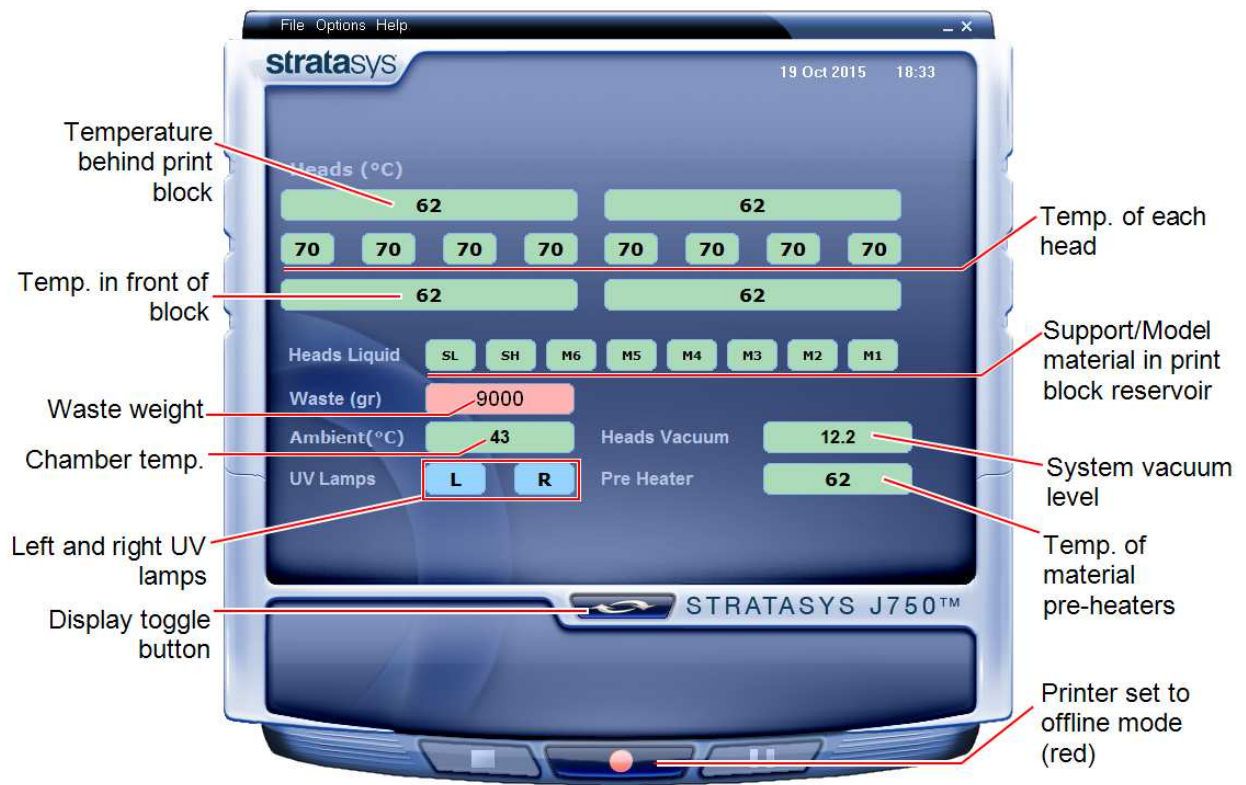


Figure 6-4 Printer indicators

Printer Interface Color Key

The background colors in the printer indicator fields tell you at a glance whether or not the value or item is suitable or ready for printing.

- *Green*—suitable/ready for printing

For example, in Figure 6-4 on the previous page:

- Heads (°C)*—The heads have reached the temperature required for printing models.
- Ambient*—The ambient temperature of the printing chamber is within the acceptable range.
- Heads Liquid*—The level of Model and Support material in the print-block reservoir is OK.
- Heads Vacuum*—The vacuum level in the system is within the acceptable range.
- Pre-Heater*—The Model and Support resins need to be heated before being supplied to the print block. The temperature has reached the acceptable range.

- *Red*—not suitable for printing (or indicates a warning)

For example, in Figure 6-4 on the previous page:

- Waste*—The weight of the waste container is 9000 grams, more than allowed when beginning a print job. ("Replacing the Waste Container" on page 6-88.)

- *Blue*—not ready

For example, in Figure 6-4 on the previous page:

- UV lamps*—The UV lamps are not on.

The color of the material cartridges displayed in the printer interface indicates which cartridges are active for the current (or next) print job.

- *Blue*—active cartridges
- *Gray*—reserve cartridges

Printing Indicators

The printer interface screen changes when you send a print job to the printer, if the printer is *on line*:

- The mode changes from *Pre-print* to *Printing*.
- The specific activity being performed is shown in the “current activity” field.
- Current job-printing information is displayed.
- The printing progress bar is displayed.
- The *Stop* and *Pause* buttons are enabled.

When the weight of a cartridge drops below 100 grams, the display of the material level in the printer interface is *red*.



Figure 6-5 Printer interface during printing





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 *Standby* or *Idle* mode, you need to resume printing from the print manager (in PolyJet Studio or in GrabCAD Print).



After printing stops, the printer goes into *Standby* mode, when heating of the print heads is reduced. About 10 hours later, the printer goes into *Idle* mode, when heating of the print heads is stopped.

To continue printing the model:

1. If the printer is in offline mode, switch it to online mode by clicking the red button at the bottom of the printer interface (see Figure 6-3 on page 6-4).
The button changes from red to green (see Figure 6-3 on page 6-4).
2. If you don't know why printing has stopped, make sure that the connection between the printer and the server computer is active.
3. In the *Manager* screen of PolyJet Studio, or in the GrabCAD Print screen, click the *Resume* icon— or .
click the *Resume* icon— or .
4. In the job-preparation application, make sure that the correct slice number is entered in the *Resume* dialog box.

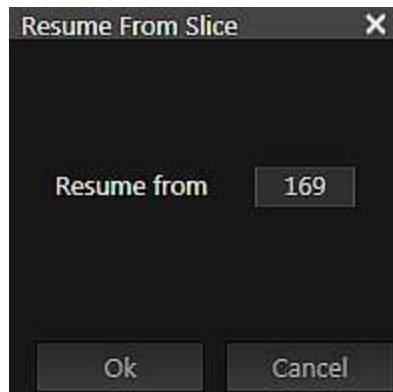


Figure 6-6 *Resume From Slice* confirmation in PolyJet Studio



Figure 6-7 *Resume Print* confirmation in GrabCAD Print

The correct slice number is the last slice printed plus one. This appears in the printer interface and in the GrabCAD Print application.

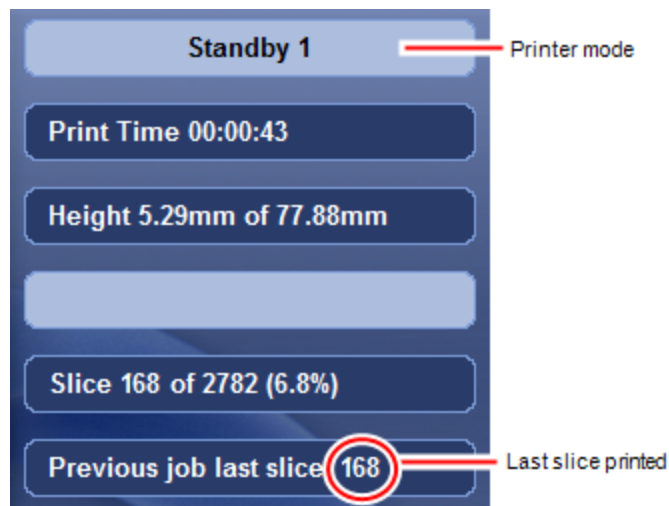


Figure 6-8 Printer interface after interrupted printing

5. If, for any reason, the correct number does not appear in the dialog box, enter the number and click OK.

You cannot continue printing the model if:

- The number of the last slice printed does not appear in the printer interface, even if the server computer displays the *Resume from Slice* confirmation dialog box.
- There was a relatively long interruption in printing, even if the “last slice” and “resume from slice” indicators are correct. The part of the model already printed may deform or shrink, and there might be a visible difference between it and the newly printed part. The effects of a printing stoppage on a model depend on the model size and structure, Model material used, ambient temperature and the length of the stoppage.

If you cannot continue printing:

1. Cancel the job in the printing application (PolyJet Studio or GrabCAD Print).
2. Remove the partially printed model from the build tray.
3. Resend the job to the printer from the printing application.



- In PolyJet Studio, click .



- In GrabCAD Print, click .



You can stop printing from the printer interface or from the printing application.

- After clicking the *Stop* button in the printing application, you can resume printing from the printing application or from the printer interface.
- After clicking the *Stop* button on the printer interface, you can resume printing only from the printing application.
- After clicking the *Pause* button in the printer interface, you can resume printing only from the printer interface.

Changing the Printing Material

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.



When changing the type of Support material, run the Material Replacement wizard and the Head Optimization wizard to ensure quality printing results. (After changing Support material with the wizard, Head Optimization is required before printing models.)



You should carefully plan printing models with different Model materials to avoid unnecessary waste of the materials currently loaded. The amount of material flushed depends on the flushing cycle chosen and if you are replacing one or more Model cartridges.

The Material Replacement wizard suggests the best slot locations for placing different material cartridges, based on the materials currently in the system. This ensures minimum flushing of materials currently loaded.

To replace the printing material with the wizard:

1. Start the Material Replacement wizard from the *Options* menu.

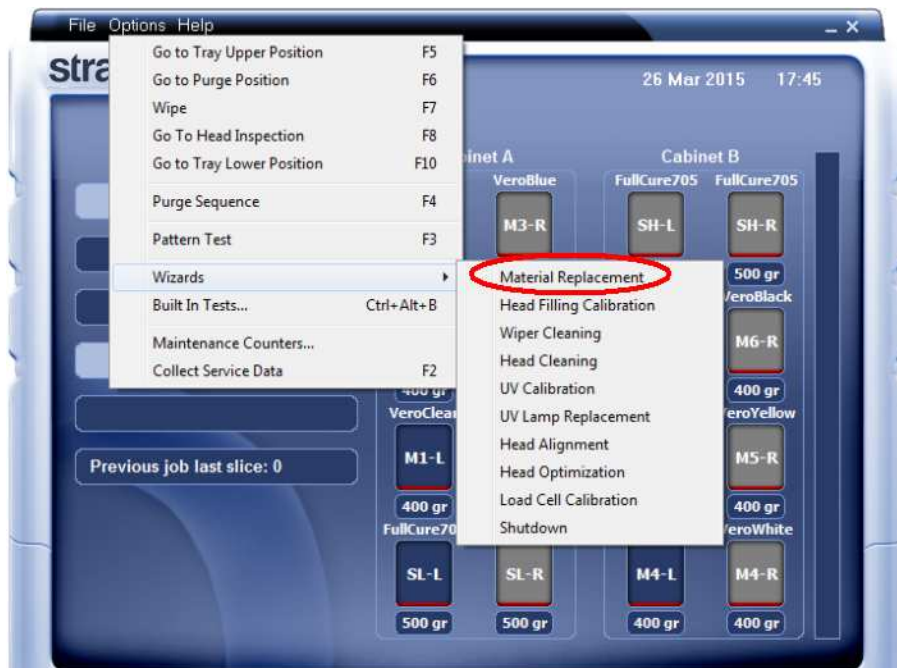


Figure 6-9 Starting the Material Replacement wizard

2. In the opening screen, click Next.
3. If the printer cover is not closed, a screen appears, prompting you to close the cover. Confirm that it is closed and click Next.

4. Choose the configuration for producing models:

- 6 materials
- 3 materials

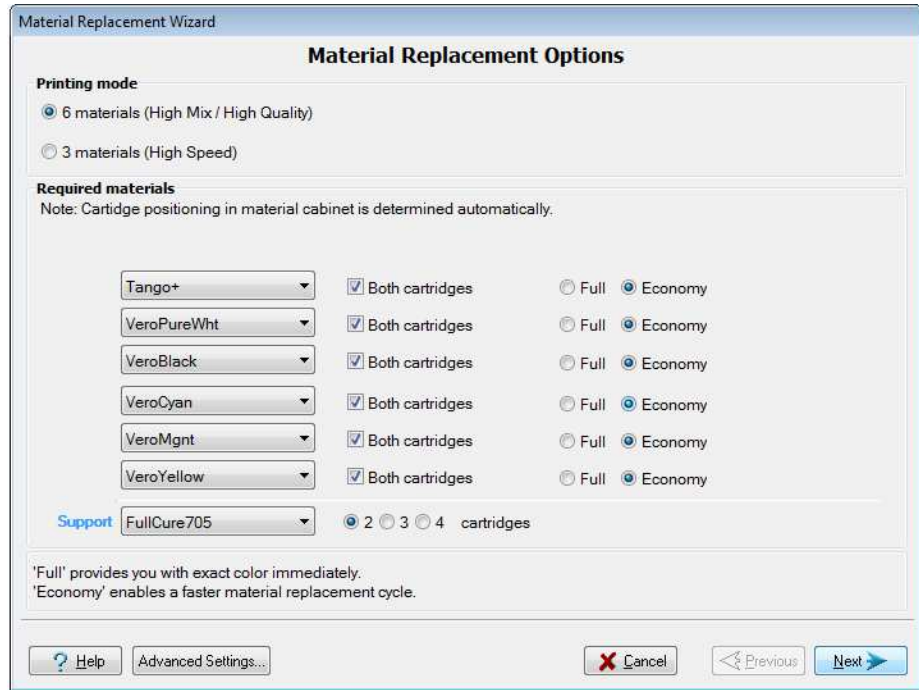


Figure 6-10 Material Replacement Options

6 Materials

Each of the three Model print heads is loaded with two different materials.

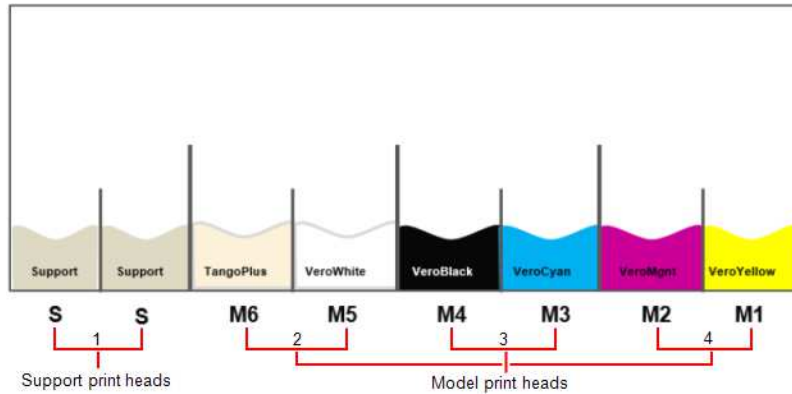


Figure 6-11 Six materials loaded in the print heads

- Once the materials are loaded, you can print with any single material, or with a combination of them. High-speed printing is not available, but high-quality models can be printed.

3 Materials

Both sections of each Model print head are loaded with the same material.

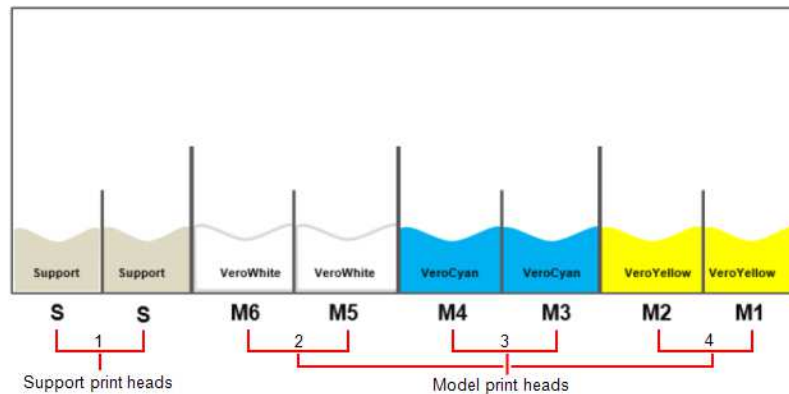


Figure 6-12 Three materials loaded in the print heads

- Up to three Model materials are available, with high-speed printing.
5. In the *Required materials* section of the wizard screen, select one or more replacement materials cartridges.
 6. For Model materials, select **Both** if you need to load two replacement cartridges.
Loading one replacement cartridge is more economical because it potentially requires less flushing of material currently in the system. However, when one cartridge is not sufficient, loading two cartridges enables continuous printing until the print job is completed. When one cartridge empties and the other one is being used, you can replace the empty cartridge with a new one.
 7. For Support material, select the number of cartridges to replace (2, 3, or 4).
Note: At least two Support material cartridges are required.
 8. If the color or mechanical properties of the first printed models are unimportant, you can change the Model materials without flushing out the current materials. To do so, continue with "Changing Model Materials Without Flushing" on page 6-19.
 9. To flush out material currently in the system, choose the flushing cycle that fits your needs:



The default flushing cycle is the one used for the last material replacement. There are additional settings that you can select for special purposes (see "Advanced Settings"). If necessary, click **Advanced Settings** before clicking **Next**.

This cycle is also recommended when changing the type of Support material.

- Economy*. This cycle can be used when replacing a light-colored Model material with a darker material (such as TangoBlack™ or VeroBlack™) or if the exact color of the printed models is unimportant. Use this cycle when replacing cleaning fluid with any Model material.

The wizard flushes the system with the minimum amount of material needed to ensure that models have the mechanical properties of the new material.

- Full*. Use this cycle when the printed models must have the *exact color* of the new material.

The wizard thoroughly flushes of the feed tubes and print heads needed for printing, based on your selections in the previous screens.

10. Click Next to begin the material replacement process in the printer.

The *Cartridge positioning* screen appears, showing you the new location of all cartridges in the material cabinet.

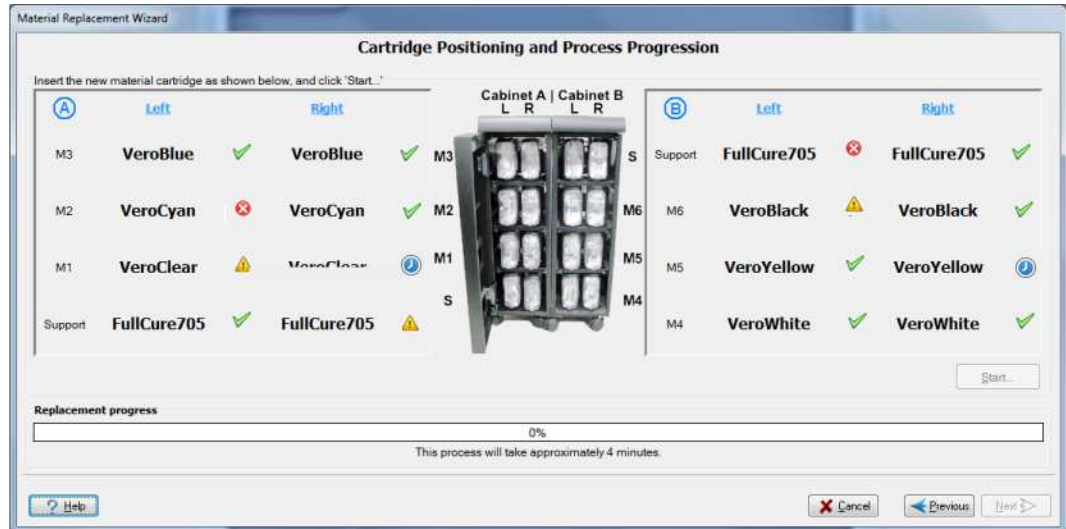


Figure 6-13 Cartridges placement

Symbols:

- ✓ The correct cartridge is in this slot.
- ✗ No cartridge (or the incorrect cartridge) is in this slot.
- ⚠ The cartridge in this slot has insufficient weight to complete the material replacement process.
- 🕒 The expiration date of the cartridge in this slot has passed.

11. Replace material cartridges as necessary, according to the instructions in the wizard screen.

12. Click Start.

13. Read the warning message, and click OK.



If you continue, you must complete the material replacement process before you can produce models. To replace material cartridges at another time, click **Cancel**. If you continue (by clicking **OK**) and you do not complete the process, you will need to run the wizard again before producing models.

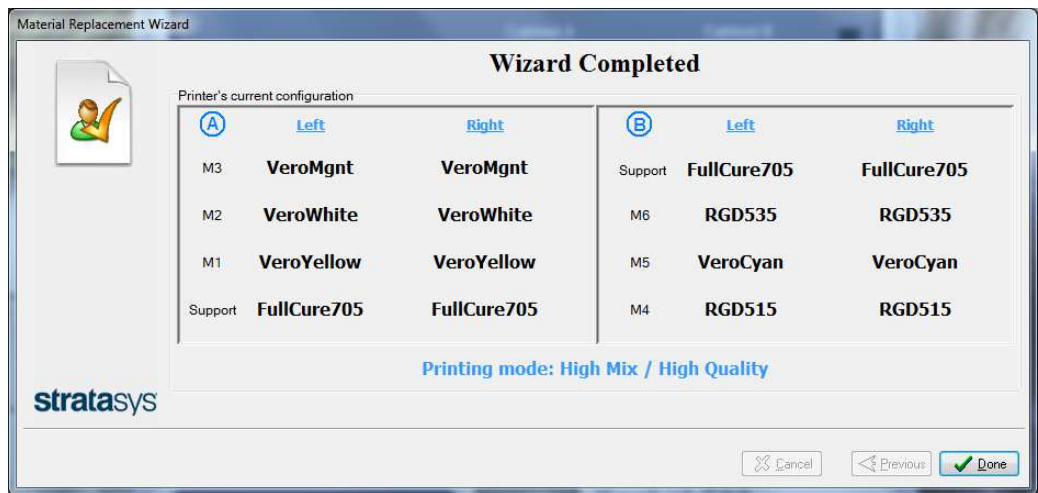


Figure 6-14 Final wizard screen

- Click Done to close the wizard.

The printer-control application is automatically updated, and the interface displays the new material(s). The interface in the job preparation application is also updated, and it displays the new material(s).

- Inspect the area around the purge unit and clean it, if necessary.



Caution

Dispose of all material cartridges in accordance with all applicable laws and regulations. If necessary, the cartridges can be disassembled for recycling. If this is done, protect the person handling the cartridges from direct exposure to uncured resins.



After changing the type of Support material (SUP705/706), you need to run the Head Optimization wizard before printing models. See "Optimizing (Calibrating) Print Heads" on page 6-43 .

Changing Model Materials Without Flushing

You can change the Model materials without flushing. Use this option when the color or mechanical properties of the printed model are unimportant.

To change Model materials without flushing:

1. In the *Material Replacement Options* screen, click **Advanced Settings**.
2. In the *Advanced Settings* screen, select **Manual slot selection** and click **Apply**.



Figure 6-15 Manual slot selection

3. When the *Material Replacement Options* screen opens, select the *Replace materials without flushing* check box and click **Apply**.

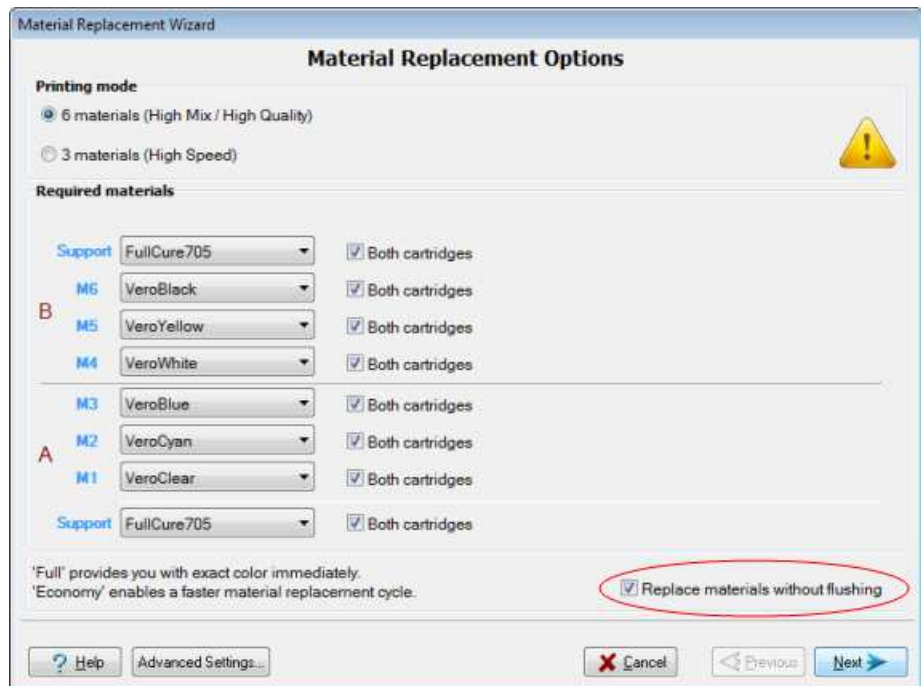


Figure 6-16 Replace materials without flushing

- In the confirmation message that appears, click Yes to continue.

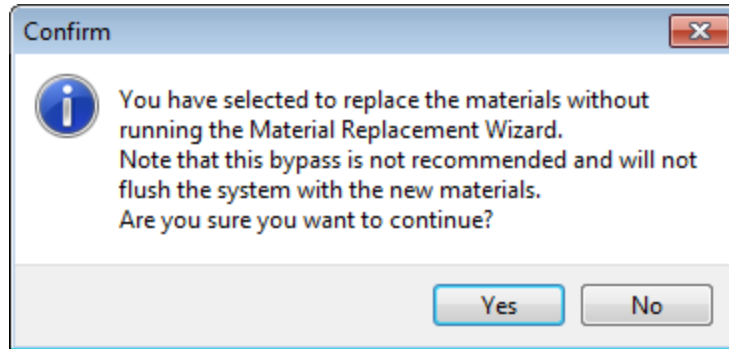


Figure 6-17 Replace without flushing confirmation message

- In the *Cartridge Positioning and Process Progression* screen, click Start.

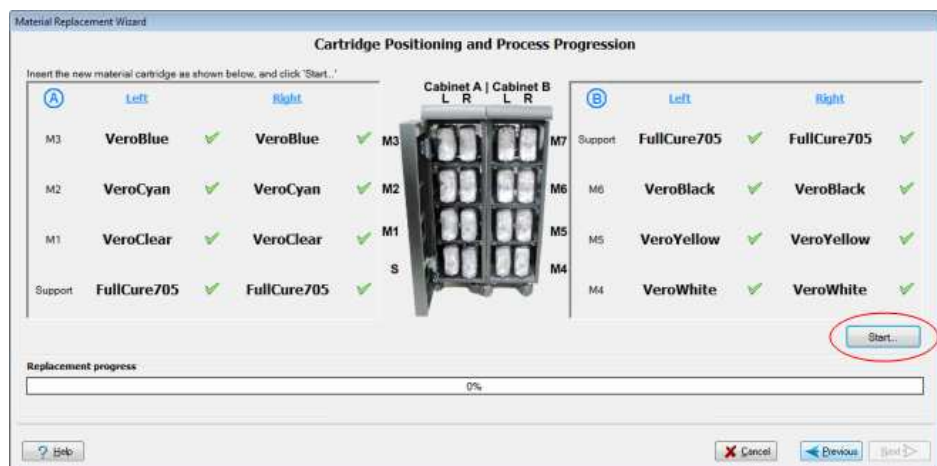


Figure 6-18 Cartridge Positioning and Process Progression screen

- Read the Warning message that appears, and click OK to continue.

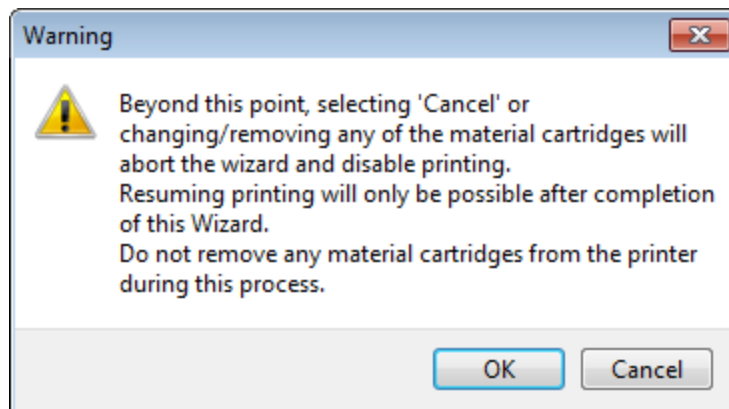


Figure 6-19 Warning message
Material replacement begins.

Advanced Settings

The *Advanced Settings* dialog box enables you to configure the Material Replacement wizard for special purposes. If necessary, click *Advanced Settings* in the *Material Replacement Options* screen before clicking *Next*.

Positioning By default, *Automatic slot selection* determines the best slot locations for the cartridges in the material cabinet, based on materials currently in the system. This ensures minimum flushing of materials currently loaded.

Select *Manual slot selection* if—

- there is a special need to load cartridges in certain slot locations.
- you only want to change one of the cartridges in certain slot locations.



Some materials cannot replace certain other materials. If you attempt to do so, the wizard notifies you.

To select the slots for the cartridges manually:

1. In the *Material Replacement Options* screen, click *Advanced Settings*.
2. In the *Advanced Settings* screen, select *Manual slot selection*, and click *Apply*.



Figure 6-20 Manual slot selection

- In the *Material Replacement Options* screen, select or clear the *Both cartridges* check box for each slot, as required.

Note: When changing Support material, select **at least two** Support material cartridge slots—one from A (either L or R) and one from B (either L or R).

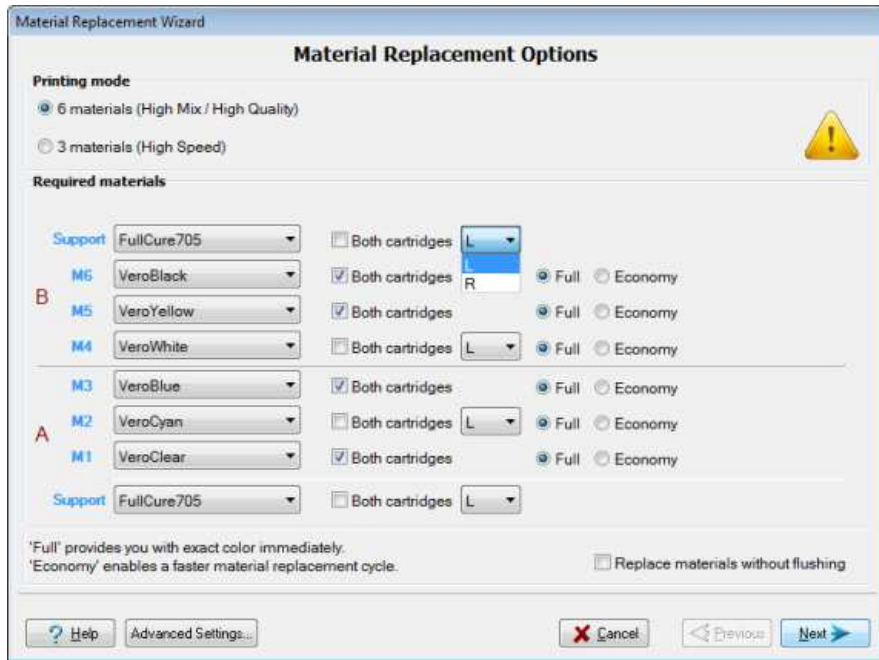


Figure 6-21 Material Replacement Options (Advanced)

- When a check box is cleared, a dropdown menu appears. Select L (left) or R (right) to change the cartridge on the *left* or the *right* side **only** in that location.

After clicking Apply, the *Material Replacement Options* screen appears, but now, each material selection box corresponds to one of the cartridge levels in the material cabinet.

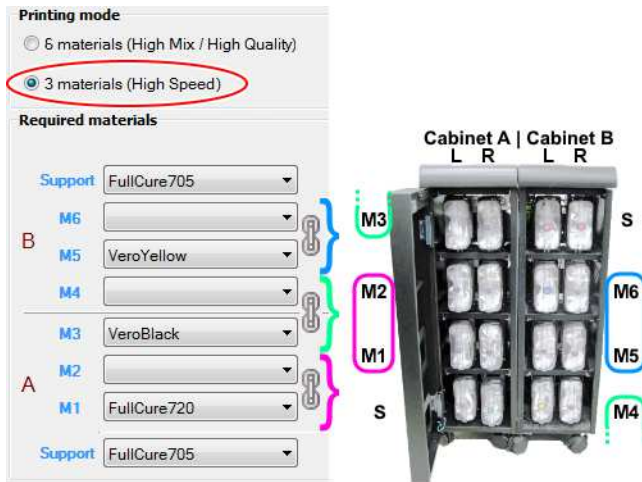


Figure 6-22 Manual cartridge placement

Additional Flushing Cycles The flushing cycle you select in the *Material Replacement Options* screen determines how thoroughly to flush out material currently in the system. After selecting the *Economy* cycle and completing the wizard, you might decide that you require a more thorough flushing, to ensure accurate model color. Or, you may notice that printed models are not satisfactory because they contain traces of the previous material. If so, you can flush out more material, so that the next models will be printed with pure material.

To perform additional flushing cycles:

- In the *Advanced Settings* screen, select Enable "flush again" options and click Apply.



Figure 6-23 *Enable flush again options selected*

The *Material Replacement Options* screen appears, where you can select the material(s) you need to flush again.

Keeping the Printer in Idle Mode

Between printing jobs, the J750 printer can be left unused for up to one week. If the printer will not be used for more than a week, 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, below).

When the printer stops producing models, the printer software automatically reduces the temperature of the print heads as follows:

| After printing stops | Mode | Change in heating of print heads |
|----------------------|-----------|----------------------------------|
| first 15 minutes | Standby 1 | no change |
| next 1 minute | Standby 2 | |
| after Standby 2 | Idle | heating stopped |

Note: The printer mode is indicated in the green field on the left of the interface (see Figure 6-3, and Figure 6-5 on pages 6-4, and 6-10).

If, after printing a job, you know that the printer will not be used for 16 minutes or more, you can immediately turn off the heating of the print heads by putting the printer into Idle mode.

To put the printer into Idle mode:

- From the *File* menu (in the printer interface) click Exit.

Note: The printer remains in Idle mode until you open the J750 printer application and begin printing again.



When the printer is in Idle mode, do **not** turn it off. It can remain in this mode—with the cover closed—for up to a week. For longer periods, shut down the printer by running the Shutdown wizard (see below).

Shutting Down the Printer

You only need to shut down the J750 printer if it will not be used for a week or more. Otherwise, the printer can remain on, in *Idle* mode.



The Shutdown process flushes printing materials from printer components. To avoid flushing out valuable material, make sure to print models at least once a week. Many printer operators use this opportunity to print customer samples or test models.

To properly shut down, the printer needs to perform several processes. These are controlled by the Shutdown wizard. **Do not attempt to shut down the printer by simply closing the computer interface (the printer-control application), and never disconnect power to the printer before completing this wizard.**



Caution

Not using 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 between a short shutdown procedure, and a more thorough procedure.

- **Up to 30 days:** The wizard empties the print block of Model and Support material, to prevent leaks. 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 75 minutes, and you must be present to load cleaning-fluid cartridges when instructed.

Shutdown Wizard

To run the Shutdown wizard:

1. Start the Shutdown wizard from the *Options* menu.

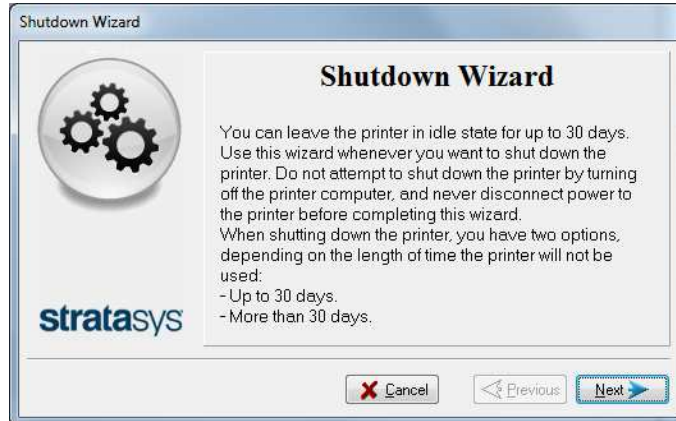


Figure 6-24 Shutdown wizard, opening screen

2. Click Next.
3. Select the option corresponding to the length of time that the printer will not be used—less or more than 30 days.

Note: Before selecting *More than 30 days*, make sure that cleaning-fluid cartridges are available.

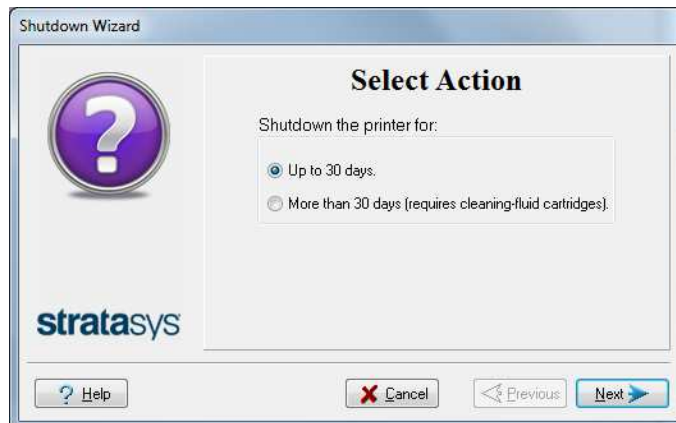


Figure 6-25 Shutdown options

4. In the next screen, indicate whether or not the tray is empty and click Next.

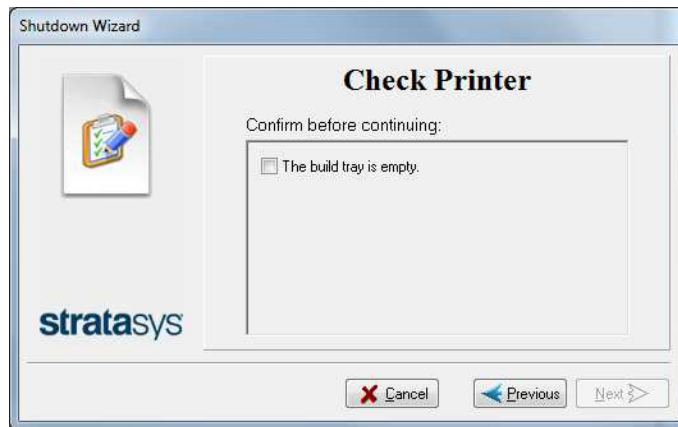


Figure 6-26 Tray status screen

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



Figure 6-27 Shutdown progress screen

6. Follow the instructions until cleaning is completed.

7. When the final wizard screen appears, close the printer-control application and shut down the printer computer.



Figure 6-28 Final Shutdown wizard screen

8. After the printer computer shuts down, turn off the main power switch at the back of the printer (see Figure 6-2 on page 6-3).

Maintaining the Printer

Performing routine maintenance tasks is essential for getting satisfactory results from J750 3D printers. Perform the tasks at specified intervals.

Routine Maintenance Schedule

| Frequency | Task | For More Information |
|---|--|--|
| Before printing | Clean the UV lamp lenses | |
| Before / after printing | Check the UV lamp overheating indicator. | See "UV Lamp Check " on page 6-32. |
| Before / after printing | Routine cleaning of: <ul style="list-style-type: none"> • print heads • roller surface • wiper • build tray and surrounding area | "Cleaning the Print Heads, Roller and Wiper" on page 6-34. |
| Weekly | Clean the purge unit waste collector. | See step 12 of "Cleaning the Print Heads, Roller and Wiper". |
| Weekly | Perform the Pattern test. | See "Pattern Test" on page 6-32. |
| Weekly | Restart the printer computer. | |
| Weekly | Clean the roller waste collector. | See "Cleaning the Roller Waste Collector and Inspecting the Roller Scraper" on page 1. |
| Every 300 hours of printing (A reminder message appears.) | Calibrate the UV intensity. | See "Testing and Calibrating the UV Lamps" on page 6-61. |
| Every 300 hours of printing (A reminder message appears.) | Optimize the print heads. | See "Optimizing (Calibrating) Print Heads" on page 6-43. |
| Monthly, and after replacing print heads | Check the alignment of the print heads. | See "Aligning the Print Heads" on page 6-40. |
| Monthly | Clean debris from the Z-axis shaft with a vacuum cleaner. | |

| Frequency | Task | For More Information |
|---|--|--|
| Monthly | Inspect the exhaust system (duct, fan, connections). | |
| Monthly | Calibrate the load cells. | See "Calibrating the Load Cells" on page 6-68. |
| Every 1500 hours of printing | Replace the waste-pump tubes. | See "Replacing the Waste-Pump Tubes" on page 6-69. |
| About once a year (as necessary) | Replace the Vero PureWhite Material Filter | See "Replacing the Vero PureWhite Material Filter" on page 6-73. |
| Every two years or every 3500 hours of printing | Preventive maintenance visit by service engineer. | |

Maintenance Counters

The printer computer application records the dates and frequency for each maintenance task. You can display the Maintenance Counters screen from the Options menu.

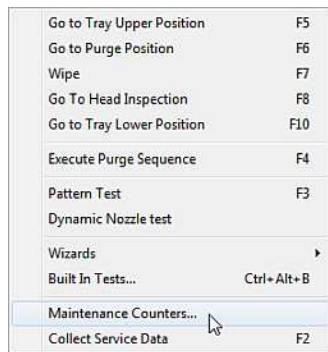


Figure 6-29 Selecting Maintenance Counters

If there is a maintenance task due, this is indicated on the main interface screen.



Figure 6-30 Maintenance Required indicator

If this indicator appears, you can display the Maintenance Counters screen by clicking on it.



The Maintenance Required indicator appears by default for most operator-performed maintenance tasks. The check box under “User Warning” controls whether or not it appears when a particular task is due.

| Item | Total | Dated | Warning Time | User Warning |
|-----------------------------|-------|----------|--------------|-------------------------------------|
| Total Printing time | 971 | 27/08/09 | N/A | |
| PM is Due | 1003 | 27/08/09 | 3500 | <input checked="" type="checkbox"/> |
| Operator Maintenance | | | | |
| UV Calibration | 1 | 27/01/15 | 300 | <input checked="" type="checkbox"/> |
| Heads Cleaning | 1 | 27/01/15 | 170 | <input checked="" type="checkbox"/> |
| HCU | 18 | 06/01/15 | 300 | <input checked="" type="checkbox"/> |
| Pattern Test | 18 | 25/01/15 | 170 | <input checked="" type="checkbox"/> |
| Roller Bath Inspection | 0 | 06/01/15 | 170 | <input checked="" type="checkbox"/> |
| Wiper Cleaning | 18 | 06/01/15 | 170 | <input checked="" type="checkbox"/> |
| Head Alignment | 18 | 06/01/15 | 300 | <input checked="" type="checkbox"/> |
| Load Cell Calibration | 18 | 06/01/15 | 500 | <input checked="" type="checkbox"/> |
| Restart Computer | 8 | 27/01/15 | 170 | <input checked="" type="checkbox"/> |
| Blade Replacement | | | | |
| Wiper Blade | 18 | 22/01/15 | 1000 | <input checked="" type="checkbox"/> |
| Roller Blade | 1 | 27/01/15 | 1000 | <input type="checkbox"/> |

Figure 6-31 Maintenance Counters screen

For maintenance tasks that are controlled by wizards, the dates and printing times are reset automatically when the relevant wizard is run and completed successfully. Manual maintenance tasks (for example, roller inspection and wiper replacement) are reset by clicking the reset button in the screen.

UV Lamp Check

A heat-sensitive label is fixed to the UV lamp covers as a warning against overheating. Its center changes from white to black if the temperature of the cover reaches 65°C (150°F). If this occurs, do not use the printer, and call your service provider. As a precaution, it is recommended that you check the label before and after printing.

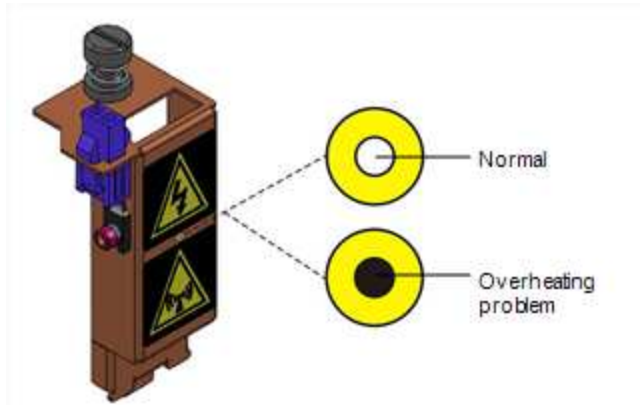


Figure 6-32 Heat-sensitive label on UV lamp cover



If the UV lamp continues to overheat, and the temperature around the lamp reaches 90°C (194°F), a heat fuse turns off the electricity to the power to the UV lamp and the motors for the X, Y, and Z axes. In the unlikely event that this occurs, the printer cannot be used until it is serviced by an authorized service engineer.

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. Make sure that the build tray is empty.
2. Prepare a sheet of pink paper—A-4 or Letter size.
3. In the printer, tape the pink paper to the surface left of the build tray.
4. Press F3, or open the *Options* menu and select *Pattern Test*.

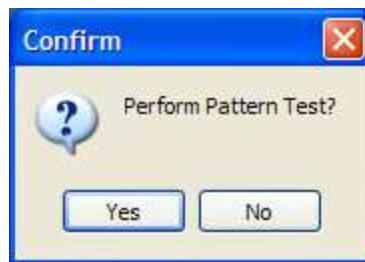


Figure 6-33 Pattern Test confirmation

5. If the build tray is *not* clear, click No in the following dialog box.

This lowers the build tray, so that models on the tray are not damaged.



Figure 6-34 Build tray (Z) level adjustment

The printer prints a series of lines on the test paper (see next figure).

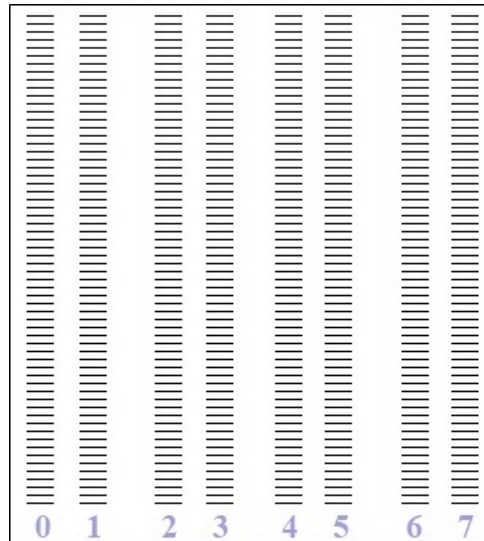


Figure 6-35 Sample Pattern Test

6. Carefully inspect the test paper to see if there are missing lines.

Too many missing lines, especially if they are in the same area, indicates that the quality of printing when producing models will be poor. If this is the case, see "Improving Print Quality" on the next page.

Note: Acceptable model quality is subjective, and depends on the type and scale (size) of the models produced. As a rule, however, more than 10 missing lines in one area of a column is considered unacceptable.

Improving Print Quality

If you suspect that print quality is poor, perform the pattern test (see "Pattern Test" on page 6-32). If the results are poor, use the following procedure to improve print quality.

If the results of the last pattern test are poor:

1. From the *Options* menu, select *Purge Sequence*, or press F4.
2. In the confirmation dialog box, click *Yes*.
The print heads are purged of Model and Support material, and the wiper removes excess material from them.
3. Repeat the purge sequence.
4. Perform the pattern test.

If the results of the pattern test are still poor:

1. Manually clean the print heads (see *Cleaning the Print Heads and the Roller* on page 1).
2. Perform the purge sequence.
3. Perform the pattern test.

If the results of the pattern test are still poor:

1. Carefully clean the print heads again, making sure there is no residue left on them.
2. Perform the purge sequence.
3. Perform the pattern test.

If the results of the pattern test are still poor:

- Optimize the print heads and replace faulty print heads, if necessary (see "Optimizing (Calibrating) Print Heads").

Cleaning the Print Heads, Roller and Wiper

Regular inspection and cleaning of the orifice plates on the bottom of the print heads prevents print nozzles from clogging. Cleaning the roller and wiper 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 the printer in optimum condition, run the 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—
 - isopropanol (IPA—*isopropyl alcohol*) or ethanol (*ethyl alcohol*)
 - disposable cleaning gloves
 - a supplied cleaning cloth or equivalent
 - a mirror

2. Start the Cleaning wizard from the *Options* menu.

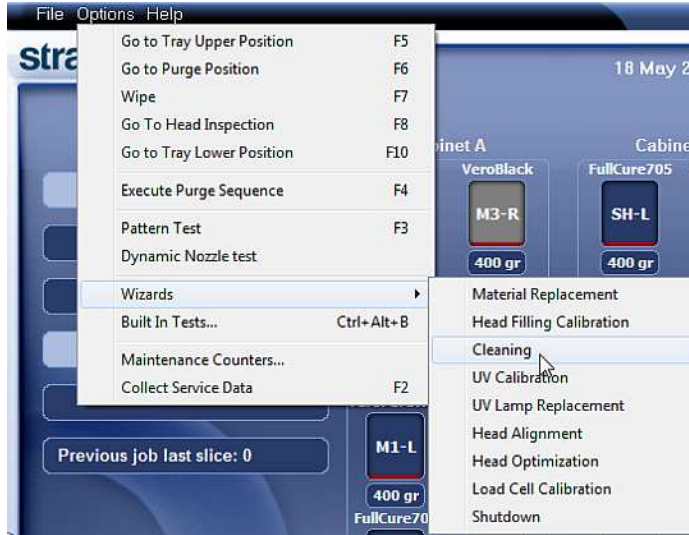


Figure 6-36 Options > Wizards menu

3. Make sure that the build tray is in the printer, and close the printer doors. Confirm this in the wizard screen and click Next.

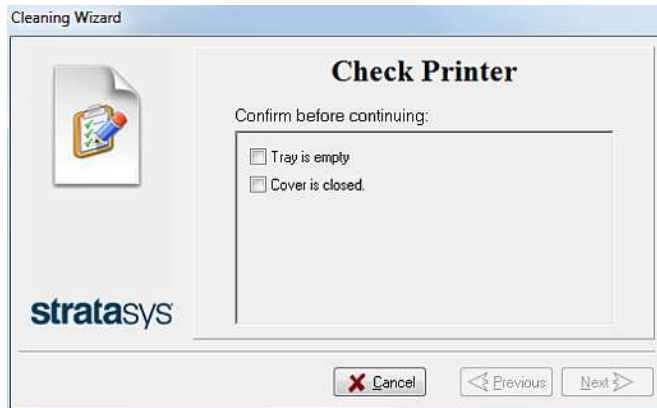


Figure 6-37 Preparation check

The printer moves components to the cleaning position.

4. When the following screen appears, open the printer.

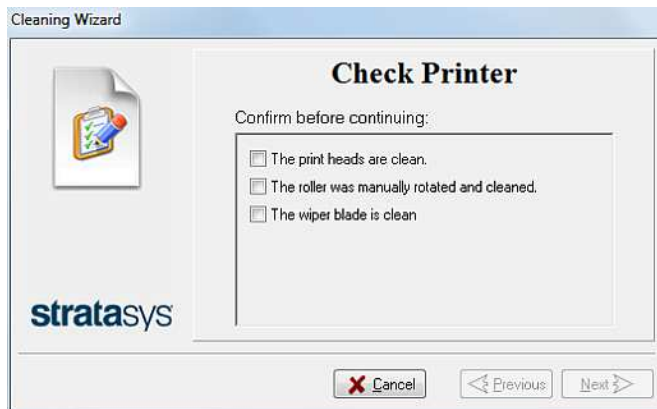


Figure 6-38 Wizard screen during cleaning tasks

**Warning: Hot Surface**

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

5. Place the mirror on the build tray.
6. Put on the gloves.

**Caution**

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

7. Soak the cleaning cloth with alcohol.
8. Clean the orifice plates, with a back-and-forth motion. Use the mirror to make sure that you have removed all of the residue material.

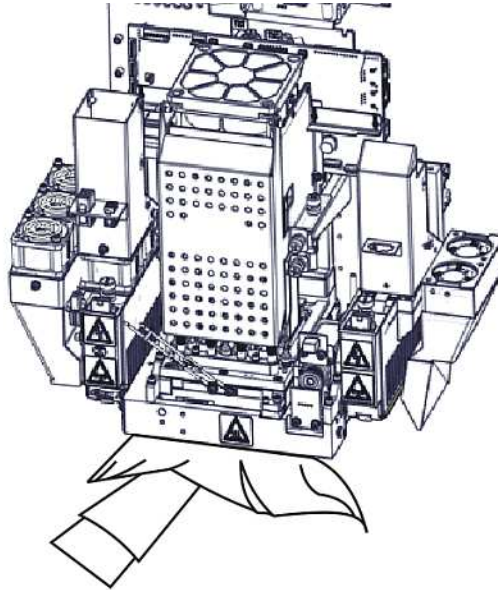


Figure 6-39 Cleaning the heads

9. After cleaning the print heads, clean the entire roller surface, by rotating it as you clean.
10. Clean the glass lens on the UV lamps.
11. Using a generous amount of alcohol on the cleaning cloth, remove any material remaining on the wiper and the surrounding area.

12. Remove any pieces of waste material collected in the purge unit. If necessary, remove the waste collector to clean it. Wipe the rubber seal.

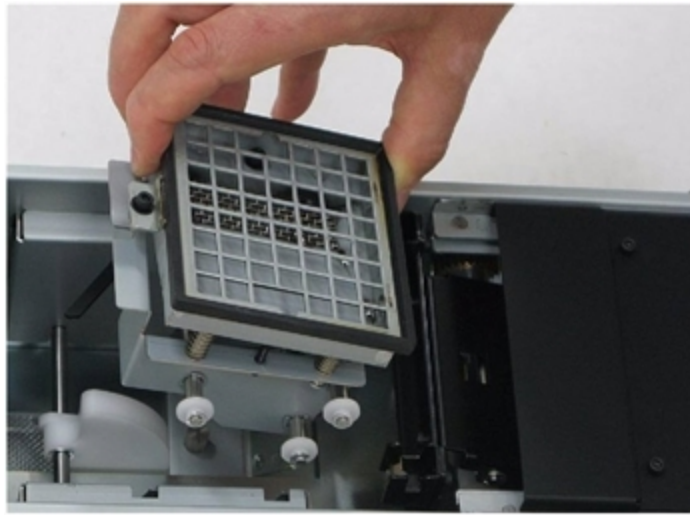


Figure 6-40 Purge unit waste collector

Note: When returning the waste collector to the purge unit, make sure to insert it as shown.

13. Inspect the wiper.
If the wiper is scratched, torn or worn, or if you cannot clean it completely, replace it.
 - a. Grasp it and pull it up and out of its bracket.
 - b. Insert the new wiper blade, making sure that it is straight and secured well on both sides.
14. When you have finished cleaning, select the confirmation check boxes in the wizard screen (see Figure 6-38) and click Next.
15. Remove the cleaning materials from the printer and close the printer cover.
16. Select the confirmation check boxes in the wizard screen and click Next.
The head-purge cycle begins. When this is complete, the final wizard screen appears.

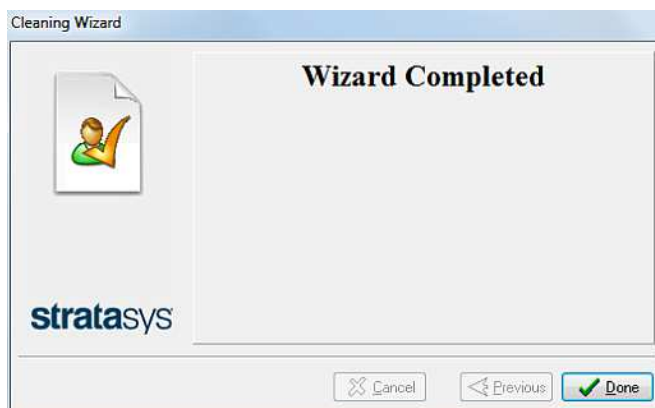


Figure 6-41 Cleaning wizard—final screen

17. Click Done to close the wizard.

Replacing the Roller Scraper

You should replace the roller scraper blade—

- after 1,000 hours of printing.
- if it does not effectively keep the roller clean.



You should periodically test the effectiveness of the roller scraper when you clean the roller waste collector. See "Cleaning the Roller Waste Collector and Inspecting the Roller Scraper" on page 1-1.

To replace the roller scraper:

1. Prepare—
 - a new roller scraper blade (KIT-01026-S)
 - a Phillips 1x75 mm screwdriver
 - M2.5 and M2 Hex (Allen) keys
2. Remove the right UV lamp and the roller waste collector covering (see steps 3 to 6 on page 1-1).
3. Loosen the two screws securing the roller waste collector and pull it out.



Figure 6-42 Removing the roller waste collector

4. Remove the screws that secure the roller scraper assembly.

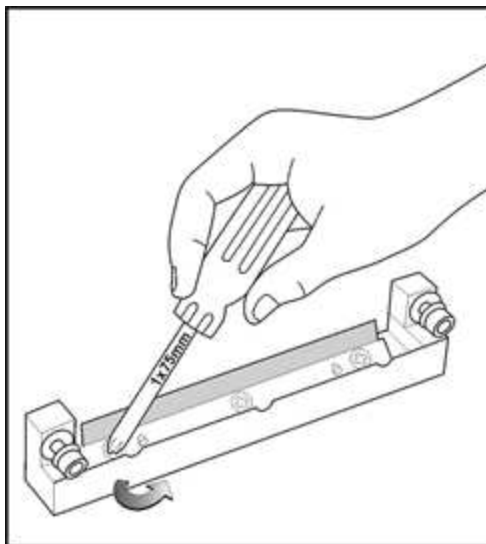


Figure 6-43 Removing the roller scraper screws

5. Remove the scraper blade and discard it.

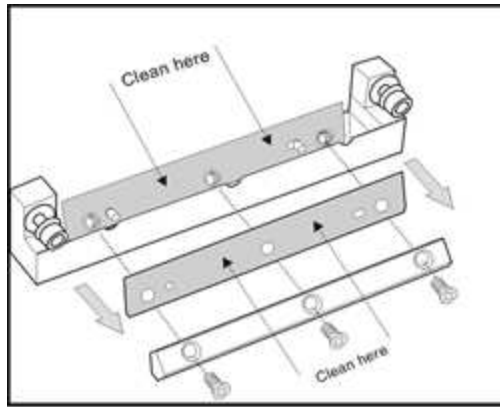


Figure 6-44 Removing the old roller scraper blade

6. Place the new scraper blade onto the pins in the holder, as shown.

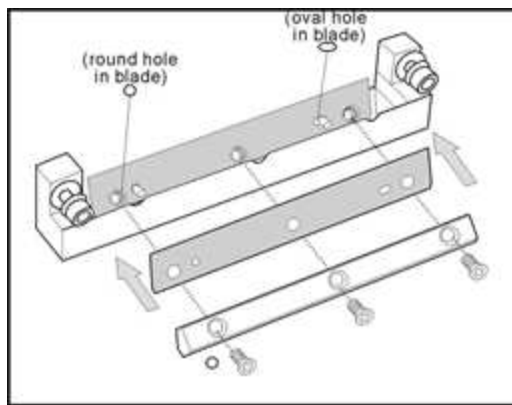


Figure 6-45 Inserting the new roller scraper blade

7. Insert and tighten the roller scraper blade screws.

Important:

- Tighten the screws in the order shown in Figure 6-46.
- Use the new screws supplied in the replacement kit

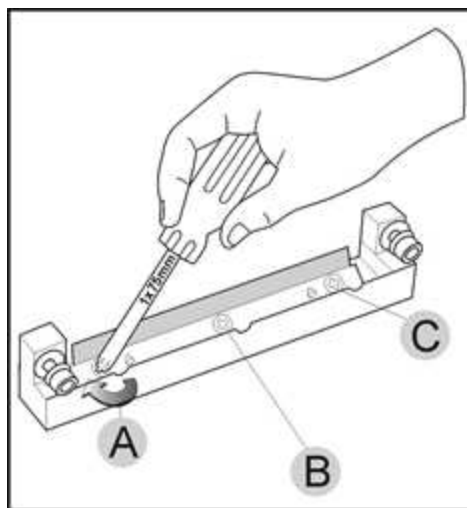


Figure 6-46 Tightening the roller scraper screws

8. After tightening the screws, inspect the blade and make sure that it is straight. If necessary, loosen the screws and tighten them again, evenly.
9. Return the roller waste collector assembly and the right UV lamp to the print block. (See steps 4 to 6 on page 1-1 in "Cleaning the Roller Waste Collector and Inspecting the Roller Scraper".)

Aligning the Print Heads

You should check the alignment of the print heads—

- once a month
- after replacing one or more heads
- if model quality is not acceptable even after cleaning the orifice plate on the bottom of the print block (see "Cleaning the Print Heads, Roller and Wiper" on page 6-34).

This procedure takes about 20 minutes.

To check the alignment of the print heads:

1. Prepare—
 - a transparency sheet—A-4 or Letter size
 - any type of adhesive tape, to fasten the transparency sheet to the build tray
2. Start the Head Alignment wizard from the *Options* menu.
3. Click Next to begin, and close the cover.
4. In the wizard screen, select the check box to confirm that the cover is closed, and click Next.
5. When instructed to do so, place the transparency on the build tray— next to the left and rear edges of the tray, as shown in the following figure.

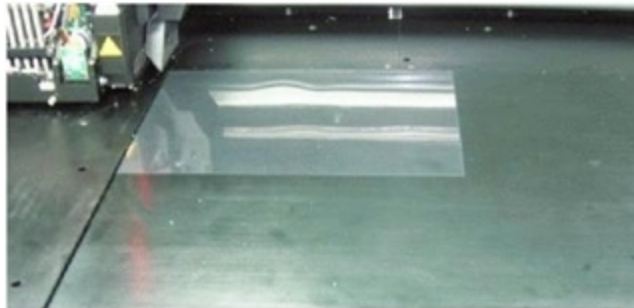


Figure 6-47 Positioning the transparency on the build tray

6. Make sure that the transparency sheet is lying flat, and tape it to the tray.
7. In the wizard screen, select the check box to confirm that the transparency sheet is on the build tray, and click Next.

The printer prints the head alignment test on the transparency.

- When the following screen appears, remove the transparency.

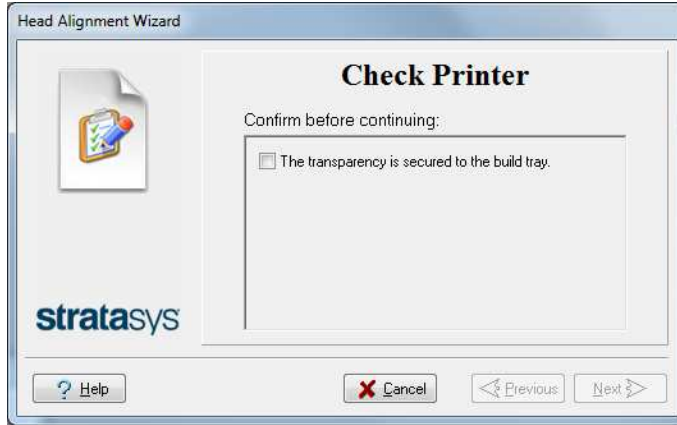


Figure 6-48 Head Alignment wizard—steps 8–10

The transparency sheet is printed with sets of vertical lines in seven columns, each showing the results from a different print head.

| Print Head Numbers | | | | | | |
|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| H0 | H1 | H2 | H3 | H4 | H5 | H6 |
| 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |

Figure 6-49 Sample head-alignment test

Note: There is no column for head H7 because its alignment is used as a reference for aligning all other heads.

- For each column of lines, use a magnifying glass or loupe to inspect pairs of consecutive rows printed on the transparency to see where the vertical lines align.

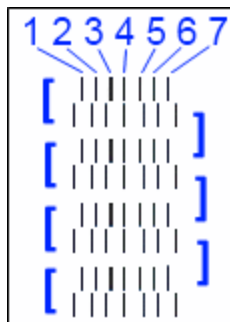


Figure 6-50 Comparing rows of alignment lines

Note: It does not matter which pair of lines you inspect, since they were all printed by the same head. Choose a pair of clearly printed lines for the inspection. (Since some nozzles may not print clearly, you may have to inspect several pairs of lines to properly view the alignment.)

Optimum head alignment is shown when the *fourth* lines in the upper and lower rows are aligned, as in Figure 6-50. In the example shown, no change to the head alignment is necessary. If other lines in the set are aligned, you need to change the alignment of that head—in the next wizard screens.

10. In the wizard screen shown in Figure 6-48, select the *Transparency removed* check box, and click *Next*.

The first in a series of alignment screens appears.

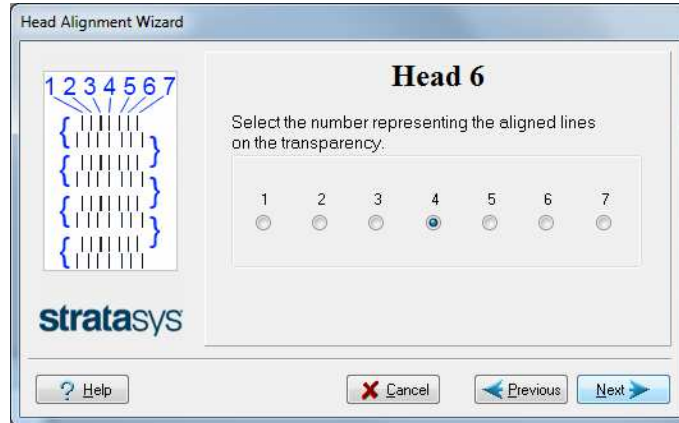


Figure 6-51 Head alignment screen

11. In the head-alignment screen, select the number that indicates which lines align in the upper and lower rows of a pair on the transparency (counting from the left) for this print head.

Note: Because the alignment of the fourth lines is optimum, the number “4” is selected, by default, in the wizard screen. This does not change the head alignment. If you select other numbers, the wizard adjusts the head alignment, accordingly.

12. Click *Next* to display the next head alignment screen, and again select the number representing the most closely aligned vertical lines on the transparency for that print head.

When you have finished aligning all of the heads, the following screen is displayed.



Figure 6-52 Parameter update confirmation

13. Continue as follows:

- To make the alignment changes in the printer, make sure that *Update system with new parameters* is selected, and click **Next**.
- To recheck the alignment test results before making the alignment changes in the printer, click **Previous**.
- If you do not want to make alignment changes in the printer at this time, select *Keep previous parameters* and click **Next**.

14. In the following screen, you can choose to either repeat the head alignment procedure or close the wizard.

The transparency test will show if the heads are now properly aligned, and—if not—the wizard will allow you to “fine tune” the alignment.

- If the vertical lines for the print heads were not aligned at either extreme, choose *End the wizard*, then click **Next**.



Figure 6-53 Repeat head alignment option

Optimizing (Calibrating) 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 calibrate them to the best working configuration possible by running the Head Optimization wizard every 300 hours of printing.

During this procedure, you place a scale on the build tray and connect it to the printer. Printing material (resin) is jetted from each head and its weight is automatically recorded and the wizard determines how to optimize the print heads.

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.



Run the Head Optimization wizard whenever the condition of print heads is negatively affecting the quality of printed models, or if you suspect that there is a problem with one or more of the print heads.

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

To test and calibrate the print heads:

1. Prepare—

- disposable cleaning gloves (any clean, powder-free protective gloves)
- pink paper
- the Missing Nozzles ruler
- the scale supplied for use in the Head Optimization wizard

Important: Ensure that the scale is calibrated and charged before beginning this procedure. It is highly recommended to connect the scale to the wall power socket when running this wizard.

2. Start the Head Optimization wizard from the *Options* menu.



Figure 6-54 Starting the Head Optimization wizard

3. In the opening wizard screen, click *Next* to begin.
The *Wizard Conditions* screen appears.
4. Read the conditions, select *I Agree* and click *Next*.

5. In the following screen, select Continue with Head optimization if you have recently cleaned the print heads. Otherwise, cancel the wizard and run the Head Cleaning wizard.



Figure 6-55 Clean print heads screen

6. In the following screen, make sure *Optimize all print heads* is selected, and click Next.



Figure 6-56 Procedure selection screen

7. Select the printing mode for which you want to optimize the print heads and click Next.



Figure 6-57 Printing mode selection

- When the following screen appears, tape a sheet of pink paper to the surface left of the build tray, close the cover and click Next.

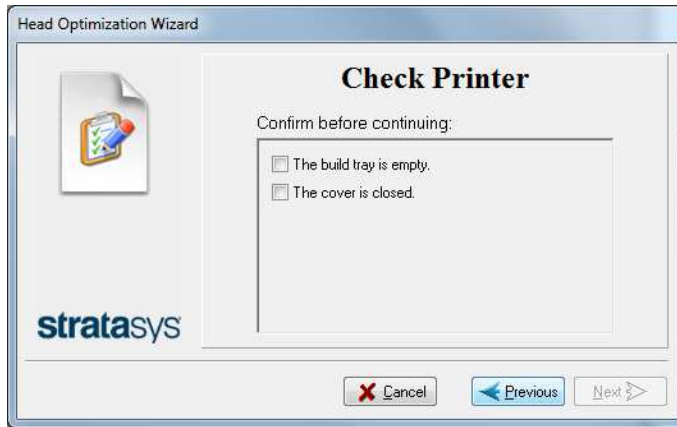


Figure 6-58 Preparations confirmation

The printer prints a frame on the build tray and then prints the Pattern Test.

- When the Pattern Test is printed, carefully inspect it, using the Missing Nozzles Ruler to see if there are missing lines.

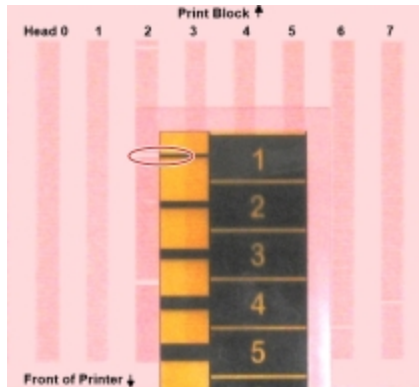


Figure 6-59 Inspecting the Pattern Test

Each missing line represents a faulty nozzle in the print head.

- In the following wizard screen, enter the number of missing nozzles for each print head and click Next.

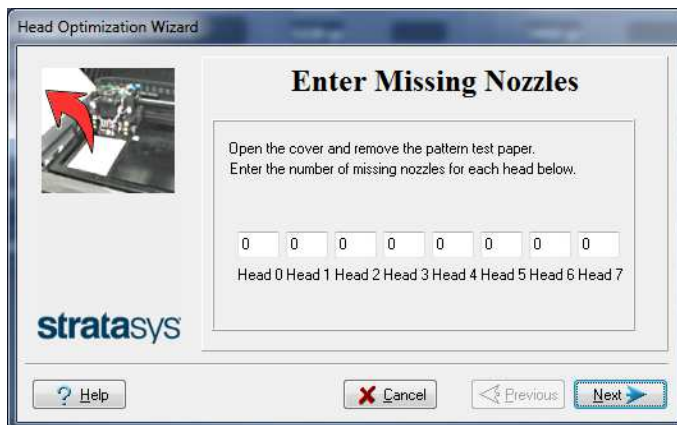


Figure 6-60 Enter Missing Nozzles screen

11. The wizard continues according to the number of missing nozzles you entered.
 - ❑ If there are too many missing nozzles for acceptable printing, the wizard instructs you to replace the defective print head(s). You can do this now, or abort the wizard.

If you are prepared to replace print heads now, the wizard guides you through the procedure when you click Next. Make sure you have replacement heads and the required tools (see "Replacing Print Heads" on page 6-50). Continue with "Preparing the Print Block" on page 6-52.

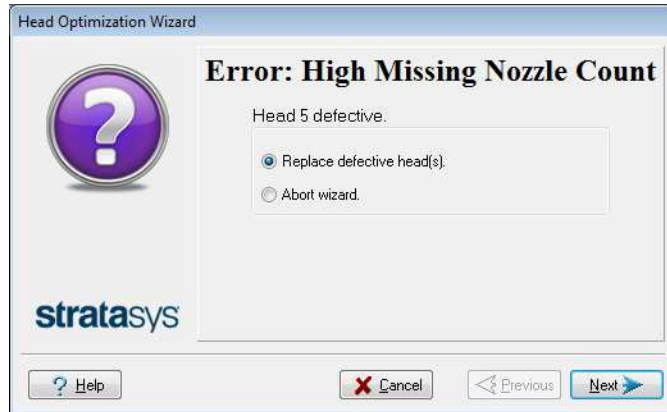


Figure 6-61 Head replacement due to missing nozzles

- ❑ If the number of missing nozzles in all print heads is acceptable, the wizard continues with the head optimization process (below).
12. Set up the scale in the printer by performing the steps listed in the wizard screen.

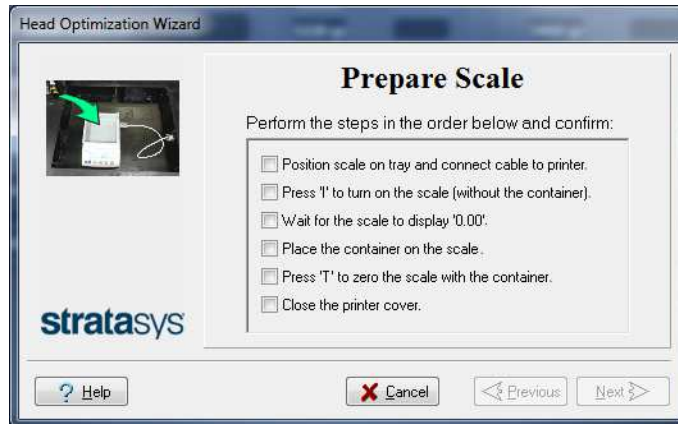


Figure 6-62 Setting up the Head Optimization scale

13. After confirming all of the items listed in the wizard screen, click Next. Printing material (resin) is jetted from each head and its weight is automatically recorded. This process is repeated for each printing mode, after which the following screen appears.

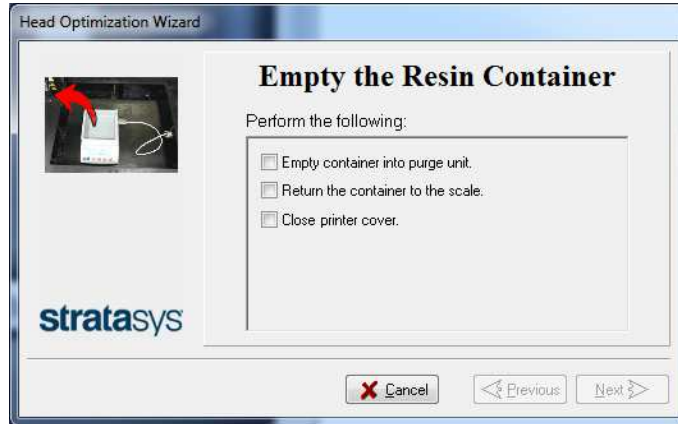


Figure 6-63 Emptying the resin container

14. Carefully remove the resin container from the scale and empty it into the purge unit in the printer. Then return the container to the scale.



Caution: The resin in the container is uncured

- To prevent contact with skin, wear neoprene or nitrile gloves.
- Dispose of uncured resin in accordance with applicable regulations. By emptying the container into the purge unit, the resin is stored in the printer's sealed waste container.

15. Close the printer and click Next.

The printer cures the remaining resin in the container.

16. When the following screen appears, remove the scale and clean the build tray.



Figure 6-64 Remove the scale confirmation screen

The wizard uses the data collected to analyze the condition of the print heads and optimize them so they print models with a uniform layer of material.

- ❑ If the heads are in satisfactory condition, the following wizard screen appears.



Figure 6-65 Final wizard screen, after optimizing print heads

- ❑ If the wizard determines that a print head is faulty—or that it is negatively affecting model quality with the current head configuration—you need to replace it. Indicate whether or not you want to do so now.



Figure 6-66 Defective print heads found

- ❑ Choose *Replace defective head(s)* if you are prepared to replace the print heads now (see below).
- or—
- ❑ Choose *Abort wizard* if you want to replace the print heads at another time.



Replace print heads only after consulting with a Stratasys-authorized customer-support engineer.

To replace print heads, you need these tools and materials:

- replacement print head(s)
- isopropanol (IPA—*isopropyl alcohol*) or ethanol (*ethyl alcohol*)
- disposable cleaning gloves (supplied with the print head; or use any clean, powder-free protective gloves)
- a supplied cleaning cloth or equivalent
- a mirror
- a 3 mm hex (Allen) key (depending on the type of print block)
- the scale supplied for use in the Head Optimization wizard (Weight Test)
- the Missing Nozzles ruler

If you are replacing print heads now, the wizard guides you through the procedure when you click **Next**. Continue with "Replacing Print Heads" below.

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 is defective. (See "Optimizing (Calibrating) Print Heads" on page 6-43.)
- There are noticeable grooves in the surface of printed models.
- Visual inspection of the head reveals that its surface is damaged—peeling or bubbles in the nozzle area.
- The printer interface displays a warning or malfunction message relating to a print head—
 - Head Heater temperature timeout
 - Head Heater thermistor open
 - Head Heater thermistor short



Replace print heads only after consulting with a Stratasys-authorized customer-support engineer.

The Head Optimization wizard guides you through the procedure of replacing a print head, and adjusts printer components to enable you to perform it.

Only replace a print head with the aid of the wizard. The entire procedure takes about 45 minutes, and consists of the following phases:

A. Identifying the head(s) needing replacement.

This is normally done by the Head Optimization wizard. Otherwise, evidence of physical damage to the head surface or a malfunction message 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 the print heads (done automatically by the wizard).

F. [Performing head alignment.](#)

To replace a print head:

1. Prepare—

- replacement print head(s)
- isopropanol (IPA—*isopropyl alcohol*) or ethanol (*ethyl alcohol*)
- disposable cleaning gloves (supplied with the print head; or use any clean, powder-free protective gloves)
- a supplied cleaning cloth or equivalent
- a mirror
- a 3 mm Hex (Allen) key, depending on the type of print block
- the scale supplied for use in the Head Optimization wizard (Weight Test)
- the Missing Nozzles ruler

Important: Make sure that you have these items and that the scale is calibrated and fully charged before continuing. It is highly recommended to connect the scale to the wall power socket when running this wizard.

2. Start the Head Optimization wizard from the *Options* menu (see Figure 6-54 on page 6-44).
3. In the opening wizard screen, click *Next* to begin.
The *Wizard Conditions* screen appears.
4. Read the conditions, select *I Agree* and click *Next*.

- In the following screen, select Continue with Head optimization if you have recently cleaned the print heads. Otherwise, cancel the wizard and run the Head Cleaning wizard.



Figure 6-67 Clean print heads screen

- In the following screen, select Replace faulty heads, and click Next.

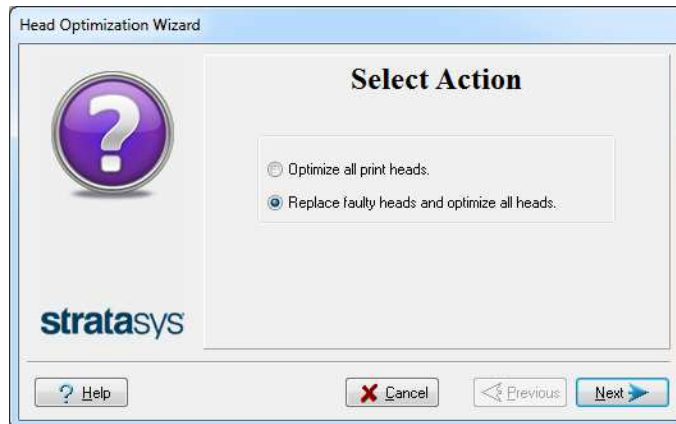


Figure 6-68 Procedure selection screen

Preparing the Print Block

- Select the print head(s) needing replacement, and click Next.



Figure 6-69 Head selection screen

The printer heats and empties the print block, and prepares the printer. (This should take up to 15 minutes.)

8. The following screen appears when the printer is ready for you to replace print heads.

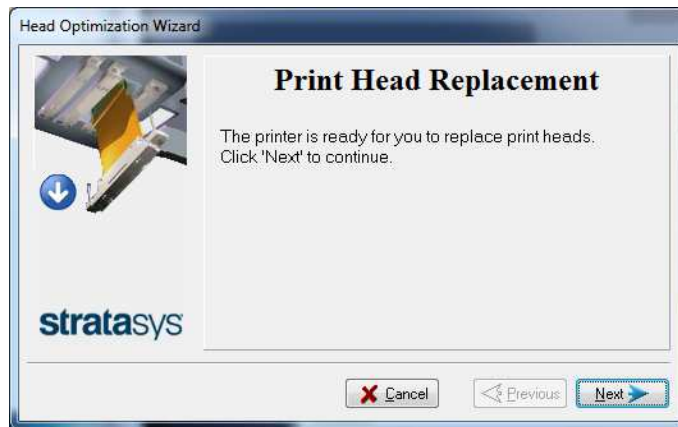


Figure 6-70 Printer ready for head replacement

9. Put on the protective gloves and open the printer cover.

Note: The printer disconnects power to the heads for your safety.

Removing the Defective Head

10. On the print block, release the upper and lower screws that secure the print head in the block. (If necessary, you may use a Hex (Allen) key to loosen the screws.)

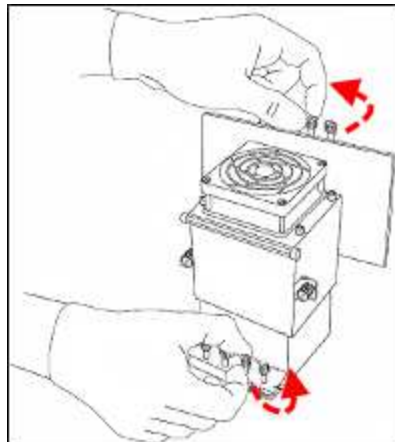


Figure 6-71 Releasing the locking screws

11. Press down on the upper and lower locking screws to release the print head.

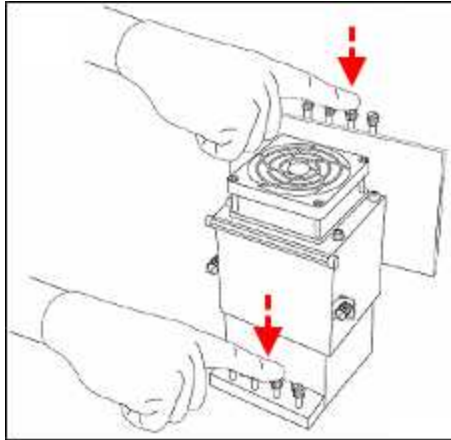


Figure 6-72 Releasing the print head

12. Loosen the screws on the door of the compartment protecting the print-head driver cards (A), then pull and lift up the door (B).

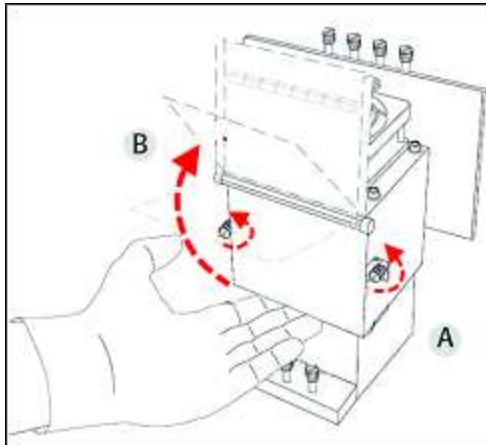


Figure 6-73 Opening the print-head compartment

13. Loosen the clips and pull the print-head driver card out of its socket so that the head is free (A), and remove it from the bottom of the print block (B).

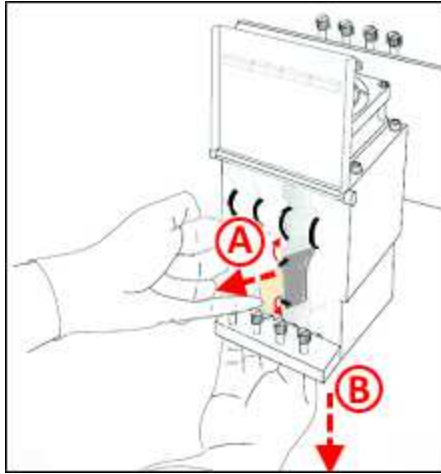


Figure 6-74 Releasing the print-head driver card to remove the head

14. Make sure that along with the head, you remove the two rubber O-ring seals.

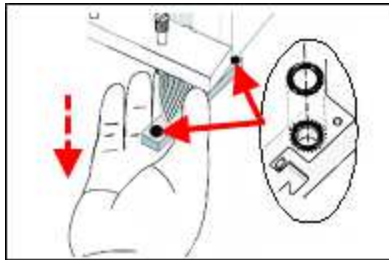


Figure 6-75 O-ring seals on the print head



Important

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

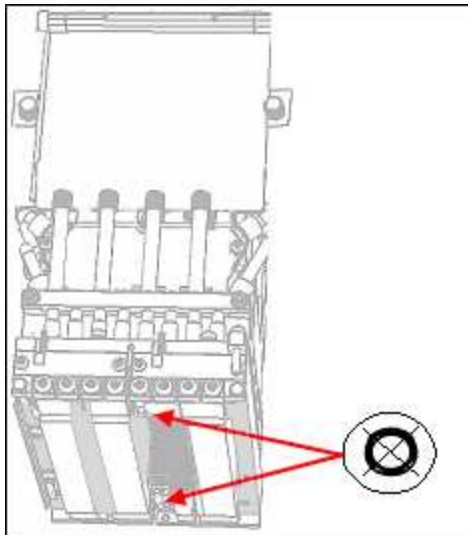


Figure 6-76 Making sure the O-rings are not stuck to the print block

Installing the New Head

15. Inspect the replacement head, and make sure that the O-ring seals are in place (see Figure 6-75 on the previous page).
16. Gently insert the replacement head into the vacant slot in the print block, and push the print-head driver card into its socket.

Note: Make sure to insert the head with the driver card facing its socket, in the rear of the print block.

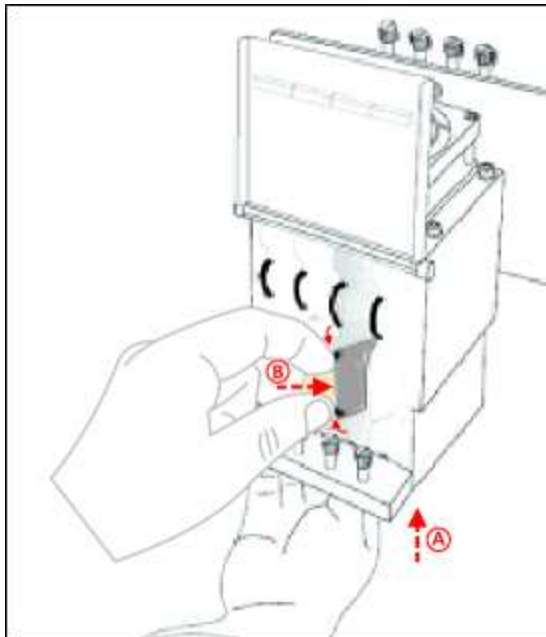


Figure 6-77 Inserting the print-head driver card into its socket

17. Push the head up. Use a mirror to make sure that the location pins are in place.

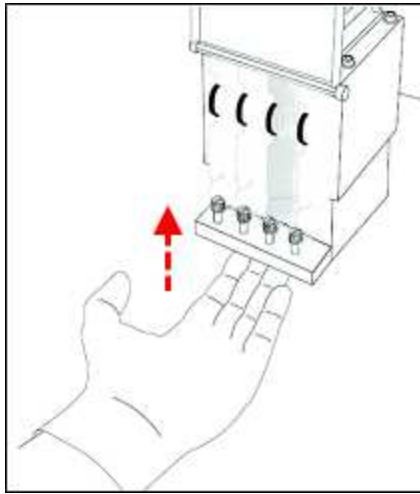


Figure 6-78 Pushing the head into place in the print block

18. Lower the door of the print head compartment, and tighten the screws to lock it in place.
19. Tighten the upper and lower screws that secure the print head in the print block (see Figure 6-71 on page 6-53).

Note: Hand-tighten these screws. Do *not* use a screwdriver.

20. In the *Replace print heads* screen, select the check box to confirm that you have replaced the head(s), and click Next.

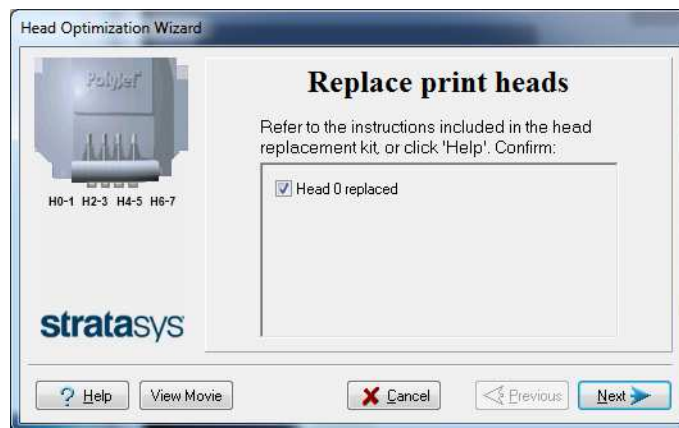


Figure 6-79 Head replacement confirmation

21. With your fingers, make sure that the new head is level and even with the other heads.

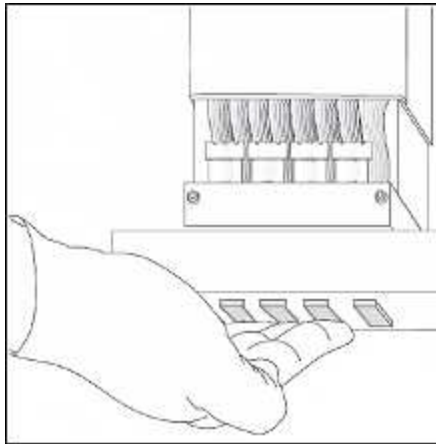


Figure 6-80 Checking the level of the new head

22. Confirm that the heads are level by selecting the check box in the following wizard screen, and click Next.

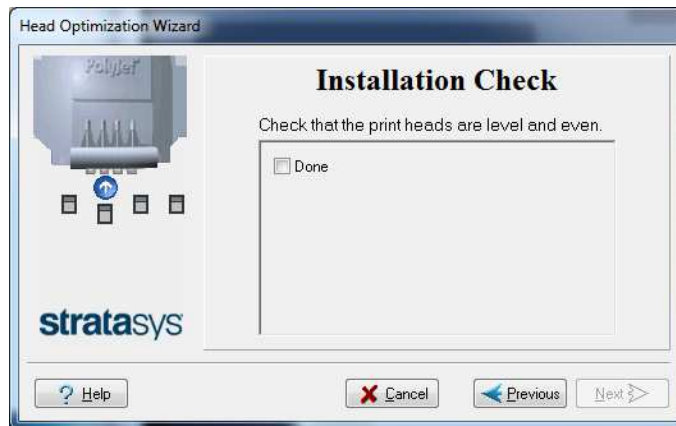


Figure 6-81 Installation-check screen

23. In the next wizard screen, confirm that you have removed all tools and objects from the printer.

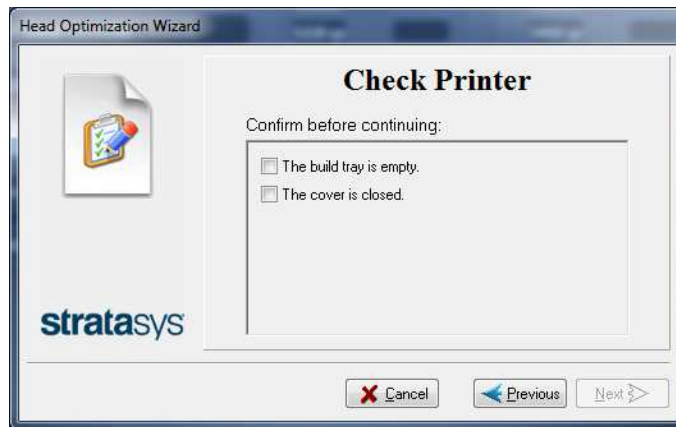


Figure 6-82 Cleared-tray confirmation screen

24. Close the printer cover.

The wizard continues by heating the heads, then filling and purging them. If there are no installation problems, the optimization procedure begins, to calibrate the print heads to the best working configuration— "Optimizing (Calibrating) Print Heads" on page 6-43.

If installation problems are detected, the wizard alerts you and instructs you how to continue (see "Installation Problems", next).

25. After replacing print heads, you should check the head alignment before using the printer to produce models. In the final wizard screen:
 - Select Optimize all print heads and click Next. Run the Head Alignment wizard.

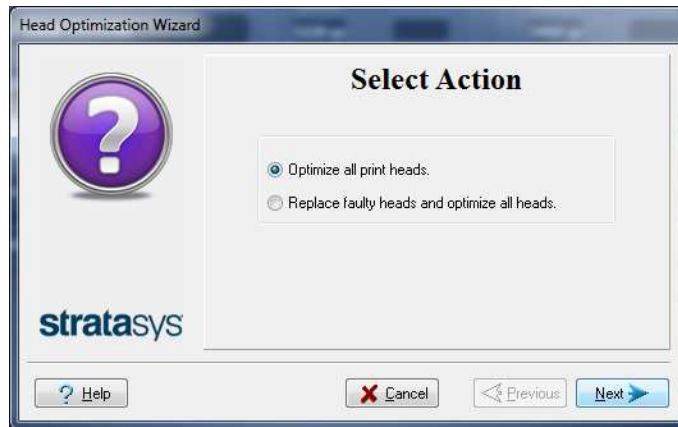


Figure 6-83 Final wizard Screen

Installation Problems If the printer detects that there is a problem after you install print heads, relevant warning screens appear.

- If the printer software does not detect the replaced head, the following warning screen appears.

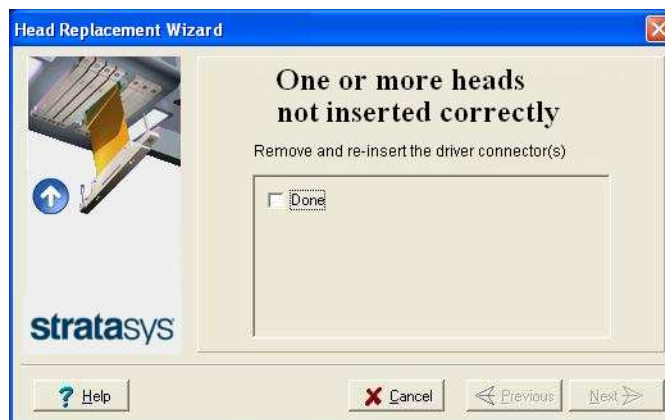


Figure 6-84 Incorrect-installation screen

If this happens:

- a. Open the print head compartment (see Figure 6-73 on page 6-54).
- b. Re-insert the print-head driver card into its socket (see Figure 6-77 on page 6-56).
- c. In the wizard screen, select the check box to confirm that you have re-inserted the card, and click Next.

- If the replacement head was not factory-calibrated, the following warning screen appears.



Figure 6-85 Invalid-data warning screen

If this happens:

- a. Remove the head and replace it with another one (starting with step 10 on page 6-53).
 - b. In the wizard screen, select the check box to confirm that you have installed another print head, and click Next.
 - c. Contact your authorized Customer Support center about the unformatted head.
- If the vacuum test is not successful, the replacement head was not sealed properly during installation, and the following warning screen appears.



Figure 6-86 Vacuum-leakage warning screen

If this happens:

- a. Click Next.
- b. Follow the instructions on the wizard screens to re-install the head.

Testing and Calibrating the UV Lamps

The level of UV radiation from the lamps used for curing models can change over time. To ensure optimum curing of models during printing, a pop-up message reminds you to test the lamps and calibrate the level of UV radiation after every 300 hours of printing. You do this by running the UV Calibration Wizard.

To measure the UV radiation, you need:

- Stratasys TOL-03005-S (UV sensor and cable)
or—
- a stand-alone UV radiation meter, approved for use with the printer

The wizard compares the measured radiation to the recommended radiation level for each of the lamps, at each printing mode—High Speed, and High Quality and Digital Material.

When calibrating the lamps, the wizard attempts to adjust the radiation level, if necessary.

- If the reading is within the acceptable range, the wizard continues to the next phase.
- If further adjustment is necessary, the current phase is repeated.
- If the level of UV radiation is too low to be properly adjusted, the wizard continues to the next phase, but the final wizard screen indicates that the lamp's radiation for the printing mode is unacceptable.



Before testing and calibrating the UV lamps:

- Make sure the glass lens on each of the UV lamps is clean. For easy access, run the Head Cleaning Wizard, and use the special cleaning pad supplied.
- Make sure that the glass over the UV radiation sensor is clean.

To test and calibrate UV lamp radiation:

1. Start the UV Calibration Wizard from the *Options* menu.
2. In the following screen, select Calibrate UV Intensity to adjust the lamp's radiation level to the acceptable range.

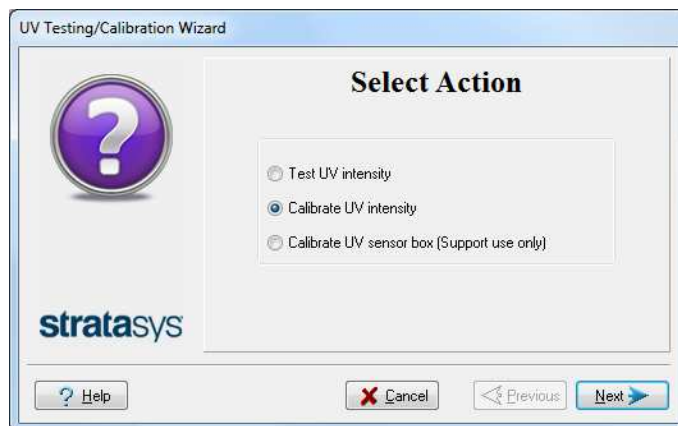


Figure 6-87 UV Test/Calibration selection

3. In the following screen, select the UV sensor and measuring device to be used.

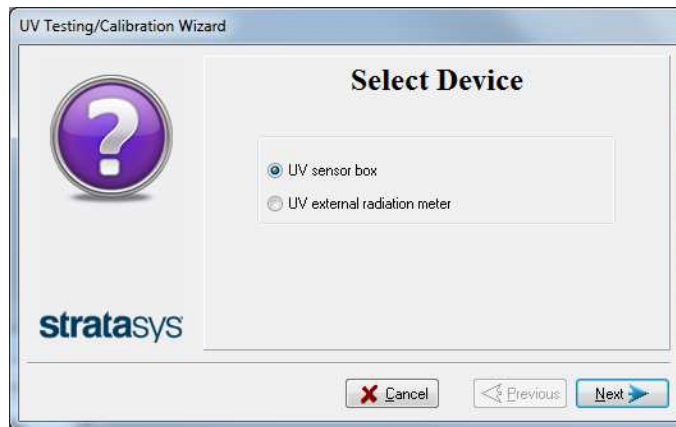


Figure 6-88 UV device selection



UV Measuring Device

When you use the Stratasys UV sensor box (TOL-03005-S), you connect it to the printer. The wizard automatically measures and calibrates the UV radiation.

If you use a stand-alone UV radiation meter, you need to manually enter the readings from the meter in the wizard screens.

4. Make sure that the build tray is empty. Confirm this in the wizard screen and click Next.

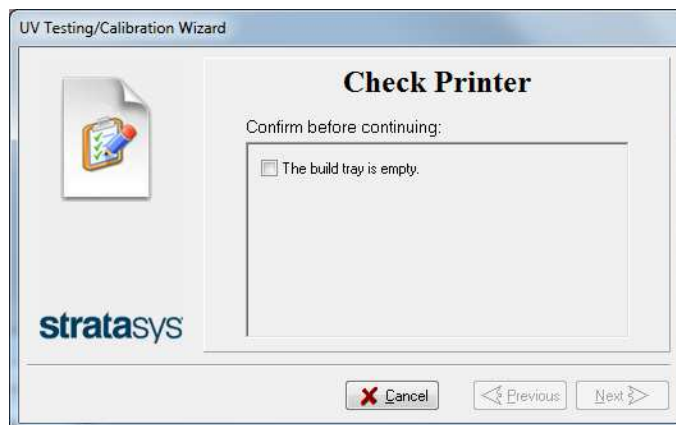


Figure 6-89 Printer preparation

- When using a Stratasys UV sensor box that you connect to the printer (TOL-03005-S), continue with "UV Sensor Connected to Printer" on the next page.
- When using a stand-alone UV radiation meter, continue with "External UV Meter" on page 6-65.

**UV Sensor
Connected to
Printer**

The following steps apply when using the Stratasys UV sensor box that you connect to the printer. They do not apply when using a UV external radiation measuring device.

1. To synchronize the wizard and the UV sensor, enter the CF number from the label on the back of the UV sensor box and click Next.

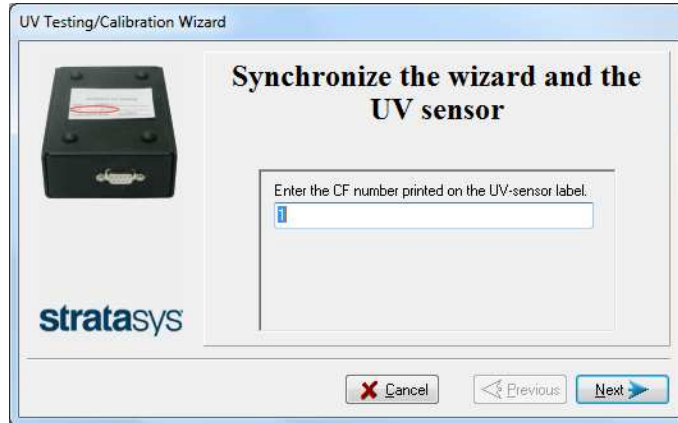


Figure 6-90 UV sensor synchronization



Figure 6-91 Label on the bottom of the UV sensor box

The build tray lowers so you can connect the UV sensor box.



Figure 6-92 UV sensor connector

2. Connect the UV sensor cable to the connector in the printer.



To ensure that the sensor cable does not interfere with the build tray when it is raised, route it *back* of the sensor.

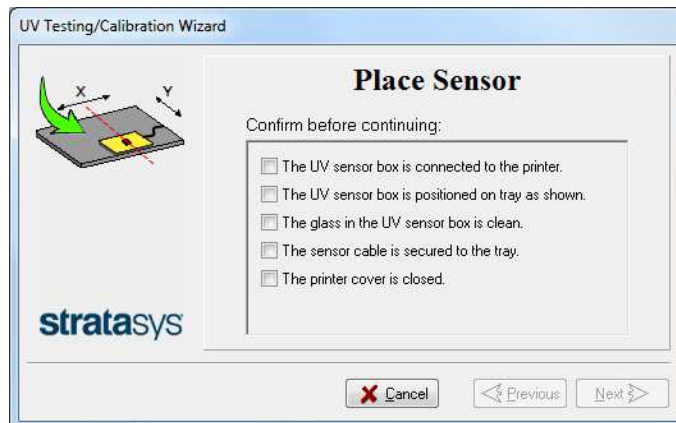


Figure 6-93 Sensor preparation

3. Confirm the items listed in the wizard screen and click Next.

Continue with "*UV Measurement*" on page 6-66

External UV Meter The following steps apply when using a stand-alone UV meter. They do not apply when using the Stratasys UV sensor box connected to the printer.

1. When the following screen appears, open the printer and place the UV sensor box at the rear edge of the tray, in the center.

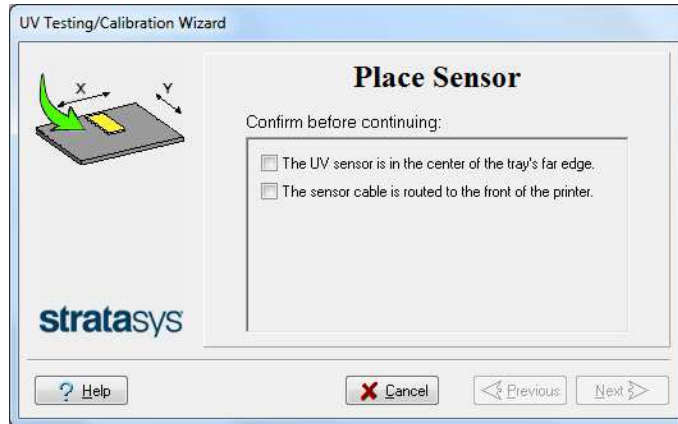


Figure 6-94 Sensor placement screen

2. Lead the cable out of the printer so that you can close the printer, and tape it down to make sure that it does not interfere with the moving print block.

Tape the cable to the build tray to keep it in place.

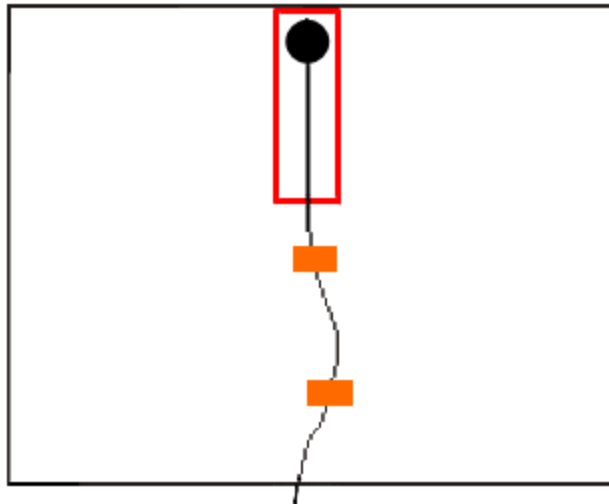


Figure 6-95 Correct UV-sensor placement

3. Close the printer, while checking that the sensor does not move out of position.
4. Set the UV meter to measure mJ/cm^2 .
5. Set the range on the meter to 2,000.
6. Connect the cable from the sensor to the UV meter.
7. Turn on the UV meter, and wait until "o o o.o" appears on the display.
8. In the wizard screen, confirm that the sensor is positioned correctly, and click Next.

Continue with "UV Measurement " on the next page.

UV Measurement The UV lamps power up and stabilize. (This takes several minutes.) Then, the print block passes over the sensor and the wizard compares the measured radiation to the recommended level for each UV lamp and printing mode. During this process, which takes 20–40 minutes, you need to monitor the progress as displayed in the wizard screen.

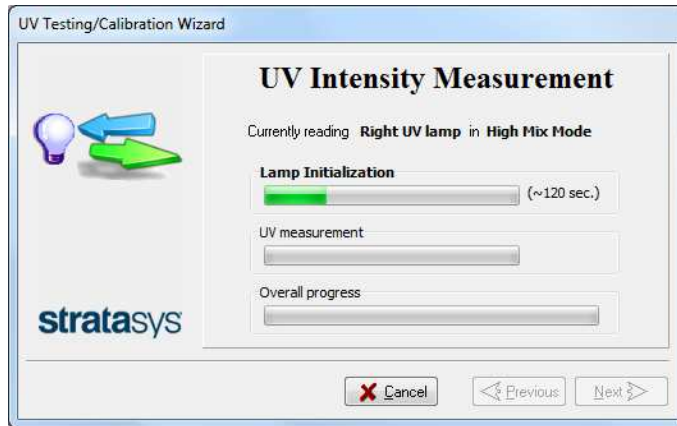


Figure 6-96 UV measurement progress

When using a stand-alone radiation meter, reset the meter and enter the reading (measurement) when you are prompted to do so.

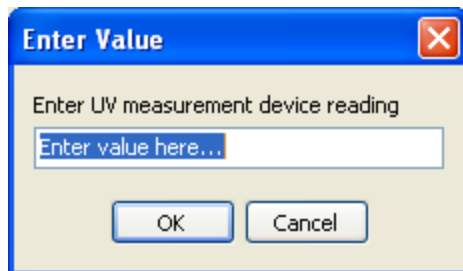


Figure 6-97 UV Measurement dialog box

If the UV level measured is not acceptable, the wizard calibrates the UV lamp by adjusting the current supplied to it, and then tests it again.

When all UV tests have finished, the results are displayed, showing the condition of the lamps after calibration (see Figure 6-98 below).

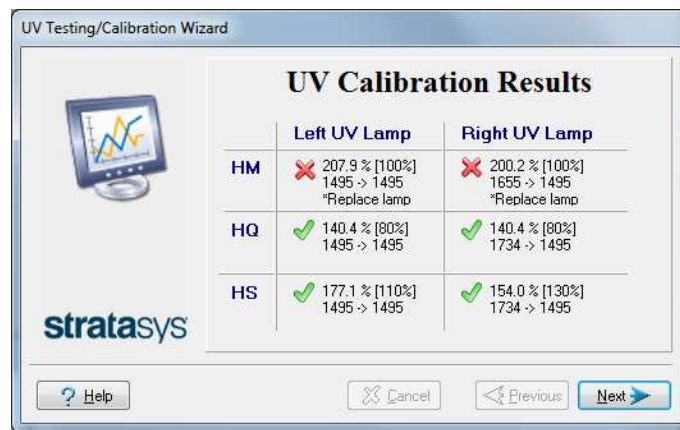


Figure 6-98 Results and condition of UV lamps after calibration

After examining the UV calibration results:

1. Click Next.
2. Remove the UV sensor and close the printer cover. After confirming the items listed in the wizard screen, click Next.

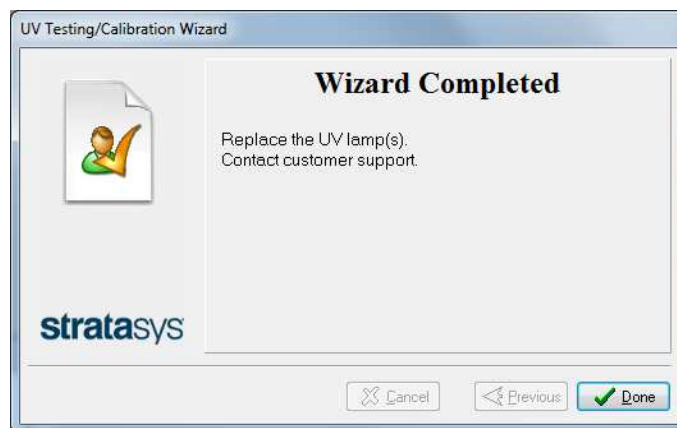


Figure 6-99 Final UV Calibration Wizard screen

Calibrating the Load Cells

Load cells are sensors that measure the weight of the material cartridges and the waste container in the printer. It is important that you periodically check that the weight measurements are accurate to prevent unnecessary waste of printing materials. It is recommended that you calibrate the load cells once a month.

To calibrate load cells:

1. Start the Load Cell Calibration wizard from the *Options* menu.
2. In the following screen, select one or more load cells that you want to calibrate.

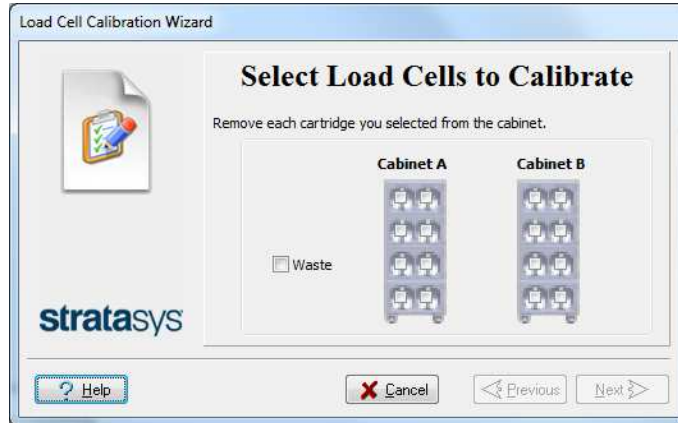


Figure 6-100 Load cell selection

3. Remove each selected cartridge from the materials cart, and click Next.
4. In the next wizard screen, observe the numbers and wait until the level is relatively stable—two units above or below the average level shown.

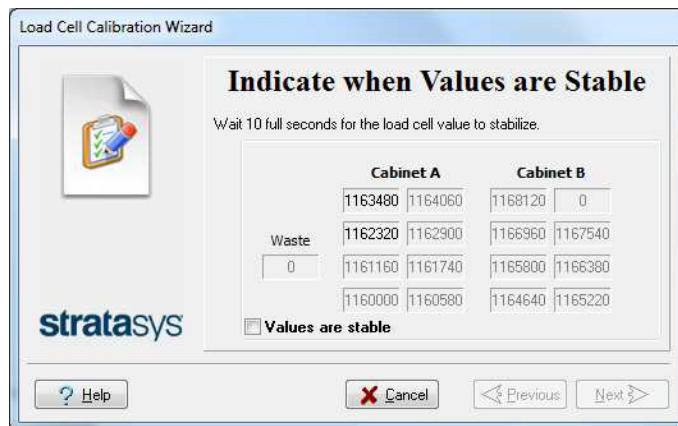


Figure 6-101 Level stabilization

5. Select the check box, and click Next.

6. Click Done in the final wizard screen.



Figure 6-102 Final wizard screen

Replacing the Waste-Pump Tubes

The tubes that pump waste material from the roller waste collector and the purge unit should be replaced after 1500 hours of printing. At this time, a counter should display a maintenance message on the printer interface screen.



Figure 6-103 Maintenance message

You can verify that the pump tubes need to be replaced by examining the waste pump maintenance counters.

To open the *Maintenance Counters* screen:

- Click on the "Maintenance Required" indicator.

or—

- From the *Options* menu, select Maintenance Counters.

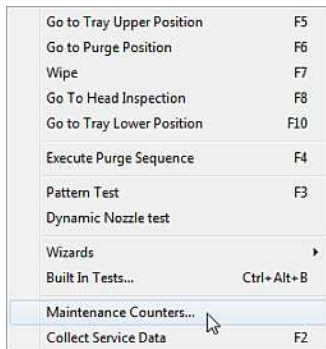


Figure 6-104 Selecting Maintenance Counters from the *Options* menu.

When the *Maintenance Counters* screen opens, scroll down to the *General Pumps* section.

| General Pumps | | | | | |
|-----------------------|------|----------|-------|-------|-------------------------------------|
| Purge Unit Pump | 2241 | 30/06/15 | 3500 | Reset | <input type="checkbox"/> |
| Roller dirt Pump | 2382 | 30/06/15 | 3500 | Reset | <input type="checkbox"/> |
| Purge Unit Pump Tube | 2387 | 30/06/15 | 1500 | Reset | <input checked="" type="checkbox"/> |
| Vacuum Pump | 7034 | 30/06/15 | 12000 | Reset | <input type="checkbox"/> |
| Roller Dirt Pump Tube | 874 | 21/02/16 | 1500 | Reset | <input checked="" type="checkbox"/> |

Figure 6-105 Pump Maintenance Counters

The waste-pump tubes that require replacing are displayed in red.

Note: If the check box on the right is selected, the "Maintenance Required" indicator appears when that task is due.

To replace pump tubes, you replace the "cassette" assembly that attaches to the pump in the printer. Replacement cassettes are supplied in the printer Start-up Kit. Additional cassettes can be ordered from your Stratasys service provider.

To replace the waste pump tubes:

1. Make sure that the printer is in Idle mode (see Figure 6-3 on page 6-4).

Note: The printer enters Idle mode about 16 minutes after printing stops. To force the printer into Idle mode, close the printer application: From the *File* menu, click Exit.

2. Using an 8 mm hex (Allen) key, open the two latches that secure the left printer panel (as you face the printer).

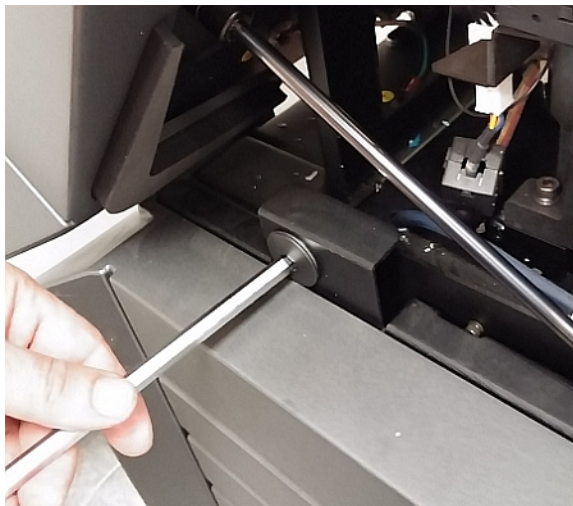


Figure 6-106 Opening a panel latch

3. Open the panel and disconnect the ground (earth) wire.

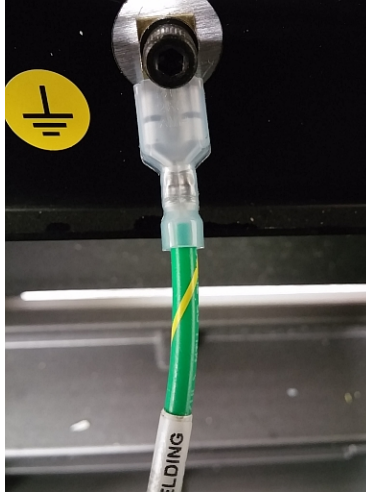


Figure 6-107 Ground wire connected to panel

4. Remove the panel.
5. Identify the waste pump that requires tube replacement.

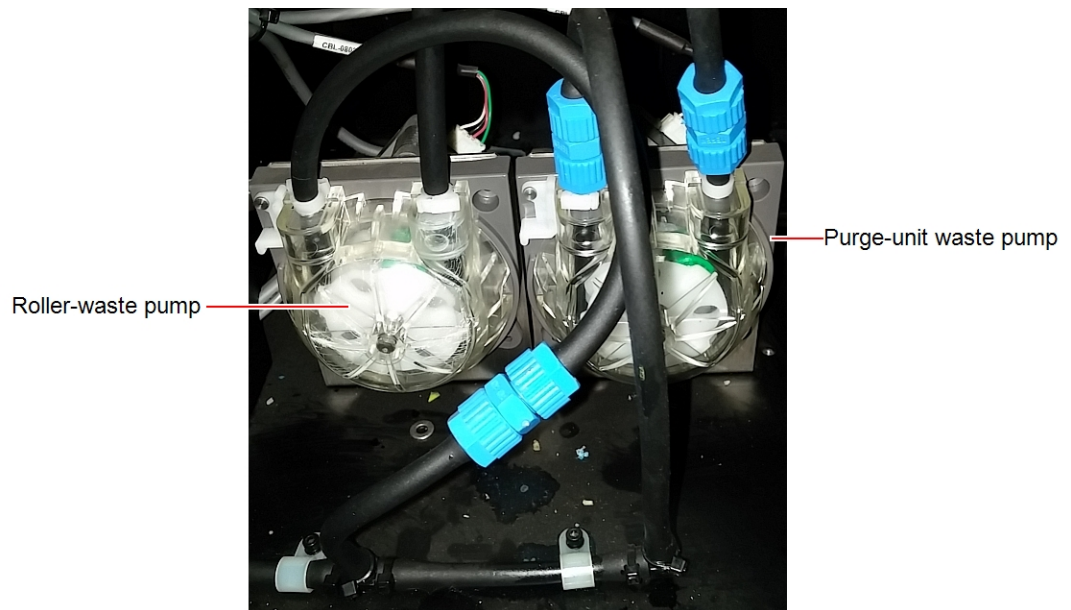


Figure 6-108 Waste pumps

6. Unscrew the fittings that connect the waste tubes to the pump.

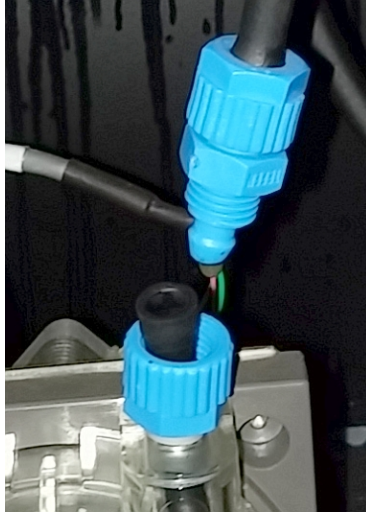


Figure 6-109 Disconnecting a pump tube

7. Remove the part of the fitting remaining on the pump tube, and save it.
8. When the tubes on both sides of the pump are disconnected, rotate the pump "cassette" assembly counter-clockwise and remove it.

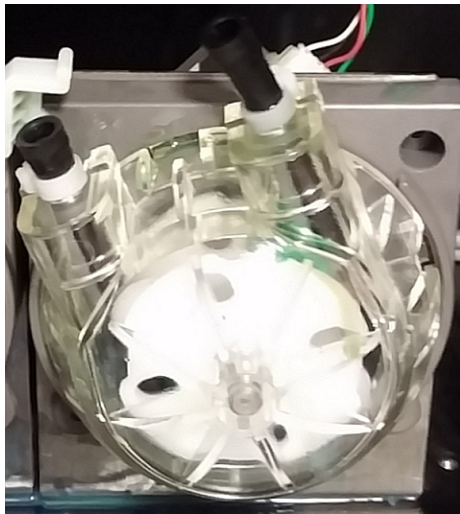


Figure 6-110 Rotating the pump cassette

9. Install a new pump cassette.
The new cassette contains a new pumping tube.
10. Connect the waste tubes to the new pump cassette.
11. If necessary, replace the pump cassette on the other waste pump.
12. Open the *Maintenance Counters* screen, scroll down to the *General Pumps* section, and click **Reset** for the relevant counter(s) (see Figure 6-105 on page 6-70)
13. Connect the ground wire to the printer panel and attach the panel to the printer.

Replacing the Vero PureWhite Material Filter

A filter is installed in the line that supplies Vero PureWhite Model material to the print heads. To ensure that the heads remain in optimum condition, this filter should be replaced periodically. A counter keeps track of the amount of material passing through the filter, and the *Maintenance Required* indicator appears in the printer interface when it is time to replace the filter. The counter is set for 15 hours—enough, on average, for about a year of printing. To check the counter, open the *Maintenance Counters* screen (see "Maintenance Counters" on page 6-30) and scroll down to the *Filters* section.

| Item | Total | Dated | Warning Time | User Warning |
|-----------------------|----------|-----------------|--------------|--|
| Total Printing time | 2302 | 30/06/15 | N/A | |
| Wiper Blade | 30 | 26/05/16 | 500 | Reset <input checked="" type="checkbox"/> |
| Roller Blade | 2302 | 30/06/15 | 1000 | Reset <input checked="" type="checkbox"/> |
| Filters | | | | |
| M1 Fine Filter | 0 | 23/05/16 | 15 | Reset <input checked="" type="checkbox"/> |
| M2 Fine Filter | 0 | 23/05/16 | 15 | Reset <input checked="" type="checkbox"/> |
| M3 Fine Filter | 0 | 23/05/16 | 15 | Reset <input checked="" type="checkbox"/> |
| M4 Fine Filter | 0 | 23/05/16 | 15 | Reset <input checked="" type="checkbox"/> |
| M5 Fine Filter | 5 | 23/05/16 | 15 | Reset <input checked="" type="checkbox"/> |
| M6 Fine Filter | 0 | 23/05/16 | 15 | Reset <input checked="" type="checkbox"/> |
| General Pumps | | | | |
| Purge Unit Pump | 2302 | 30/06/15 | 3500 | Reset <input type="checkbox"/> |
| Roller dirt Pump | 2494 | 30/06/15 | 3500 | Reset <input type="checkbox"/> |
| Purge Unit Pump Tube | 115 | 17/05/16 | 1500 | Reset <input checked="" type="checkbox"/> |
| Roller Dirt Pump Tube | 986 | 21/02/16 | 1500 | Reset <input checked="" type="checkbox"/> |
| Print Heads | | | | |

Figure 6-111 Maintenance Counters screen, showing material filter

The figure above shows that five hours of filter time have passed since the filter was installed in the M5 slot location.



The factory-installed filter for Vero PureWhite is in the M5 slot location.

To replace the material filter:

1. Prepare the following tools and materials:
 - 8 mm hex (Allen) key
 - protective gloves
 - cleaning cloths or paper towels
 - replacement filter (supplied in the Start-up kit)
2. Close the printer application.

3. Shut down the printer computer, wait 60 seconds after the monitor goes blank, and turn off the main power switch.

**Caution:**

The monitor goes blank as soon as the remote desktop link terminates—before computer shutdown. Turning off the printer before computer shutdown can cause damage.

4. Using an 8 mm hex (Allen) key, open the two latches that secure the back of the materials cabinet and remove the back of the cabinet.
5. Locate the Vero PureWhite filter.

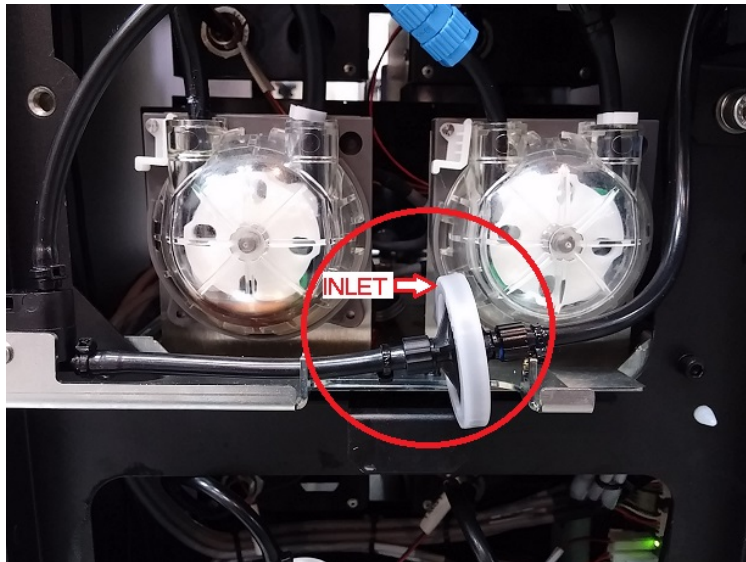


Figure 6-112 Material filter for Vero PureWhite

6. Put on protective gloves.

**Warning: Toxic and Corrosive Materials**

Prolonged contact with resins could cause skin irritation. Put on protective gloves before continuing.

7. Disconnect the tube connected to the **left** (inlet) side of the material filter.

Important:

To disconnect the feed tube, hold the fitting at the end of the tube in place and turn the filter. Otherwise, the feed tube will be twisted and material might leak.

8. Make sure that the fitting at the end of the feed-tube remains attached to the tube. Re-attach it, if necessary.
9. Cover the filter with a cleaning cloth (or paper towels) to absorb material spillage.

10. On the new filter, identify the side marked INLET.



Figure 6-113 Inlet side

11. Attach the **inlet** side of the new filter to the disconnected tube.

Important:

To attach the filter, hold the fitting at the end of the feed tube in place and turn the filter. Otherwise, the tube will be twisted and material might leak.

12. Disconnect the old filter from the other (right) tube.
13. Discard the old filter.



Caution:

The filter contains uncured printing material. Discard the filter in accordance with applicable environmental regulations.

14. Attach the disconnected tube to the new filter.

Important:

To attach the filter, hold the fitting at the end of the feed tube in place and turn the filter. Otherwise, the tube will be twisted and material might leak.

15. Wipe the filters, tubes and surrounding area to remove material leaks and spills.
16. Replace the back of the materials cabinet.
17. In the Maintenance Counters screen, click **Reset** and then **Close** (see Figure 6-111 on page 6-73).

Replacing the Odor Filter

If the printer exhaust is not connected to an external ventilation system, a built-in activated-carbon filter removes odors from printing materials. This filter should be replaced regularly (as necessary) to keep your working environment pleasant.

Replacing the UV Lamps

The UV lamps used for curing models have a long, but limited, working life. You can test and adjust their effective power with the UV Calibration wizard (see "Testing and Calibrating the UV Lamps" on page 6-61). If you need to replace a UV lamp, follow these instructions:

1. Make sure the printer is in *offline* mode.



Figure 6-114 Offline mode indicator (red)

The *online/offline* button at the bottom of the printer interface should be red. If not, click it to switch the printer to *offline* mode.



Warning

Before continuing, make sure that the safety interlock is not defeated, and that the UV lamp is not hot.

2. Start the UV Lamp Replacement wizard from the *Options* menu (see "Starting the Wiper Cleaning wizard" on page 1).
3. Make sure that the build tray is empty, and confirm this in the wizard screen. Then, close the printer cover and click *Next*.



Figure 6-115 "Empty tray" confirmation screen

The axes move to the "home" position.

- Select the UV lamp(s) to be replaced and click Next.

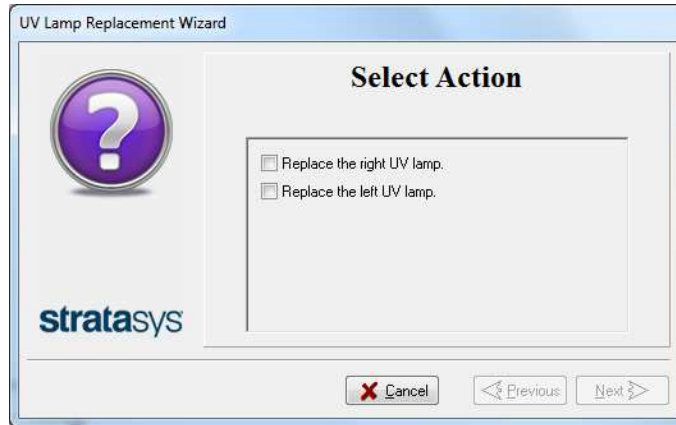


Figure 6-116 UV lamp selection screen

- Disconnect the UV-lamp power connector and the UV heat fuse connector.

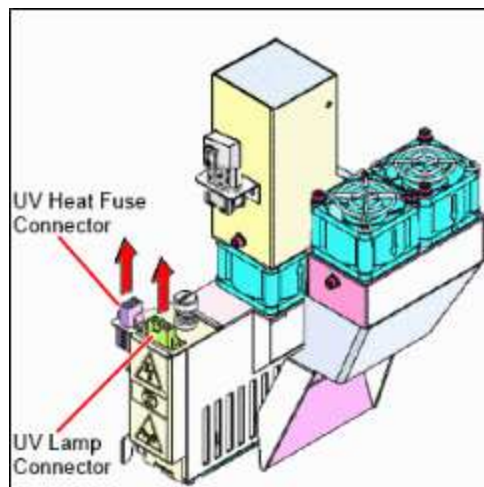


Figure 6-117 Disconnecting the UV lamp

Note: Do *not* disconnect the power connection to the cooling fans.

- Loosen the screw securing the UV lamp cover (A), and pull the cover up (B), then out (C).

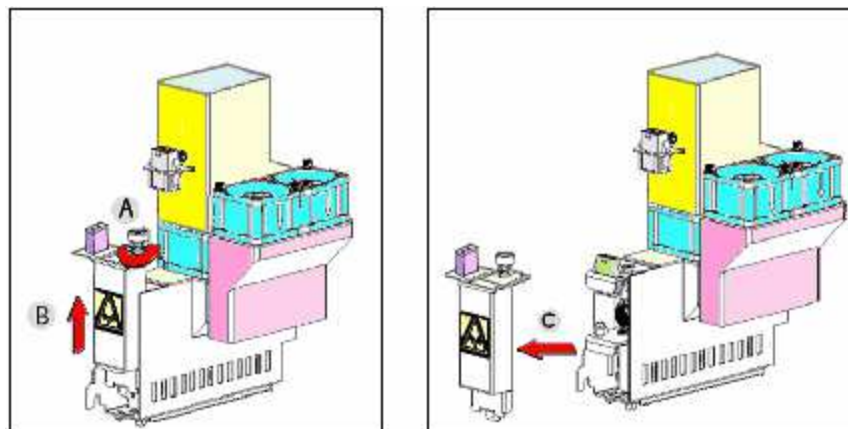


Figure 6-118 Removing the UV lamp cover

7. Pull the UV lamp reflector out of the UV housing.

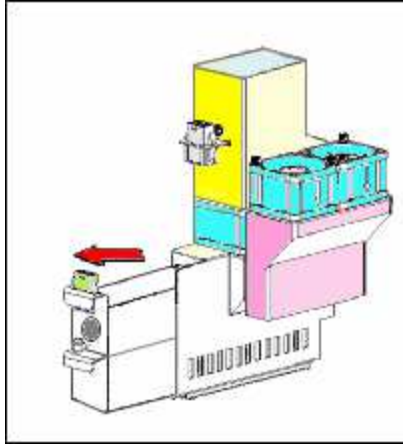


Figure 6-119 Removing the UV lamp reflector

8. Inspect the new UV lamp reflector, and make sure that a black strip is attached to the inside of it. If not, install one—on the side of the reflector *opposite* (not next to) the print block.

Note: Extra black strips are included in the printer Start-Up Kit. If necessary, you can remove the black strip from the old reflector and install it in the new reflector (as long as the black paint has not faded).

9. Discard the old UV reflector and lamp.



Dispose of the used UV lamp in accordance with environmental and safety requirements.



Warning: Broken UV lamp hazard

UV lamps contain mercury. Deal with broken lamps with caution.

- Ventilate the room thoroughly.
- Use protective gloves when collecting mercury and lamp components.
- Remove spilled mercury with a method that prevents the generation of mercury vapor, such as a syringe, packing tape or paper.
- Place the broken lamp, mercury and contaminated materials in an air-tight, non-metallic container.

10. Insert the new UV lamp/reflector unit into the housing next to the print block.

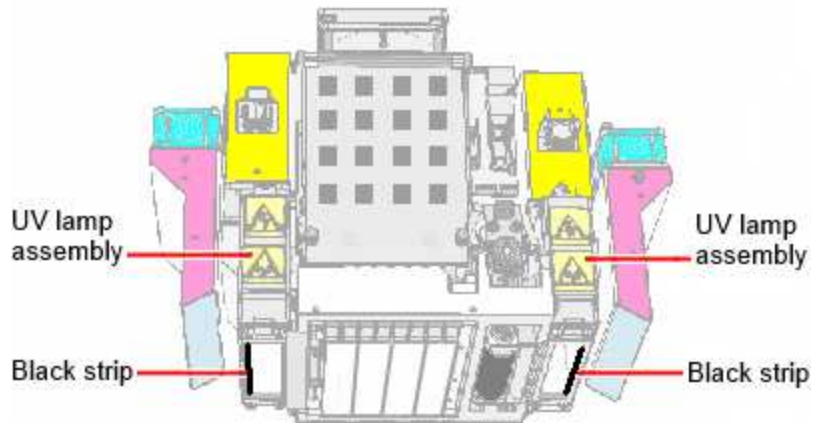


Figure 6-120 Print block and UV lamp assembly, showing correct placement of black strip

11. Replace the UV lamp cover by inserting it into the slot on the bottom of the housing, and tighten the securing screw on top.

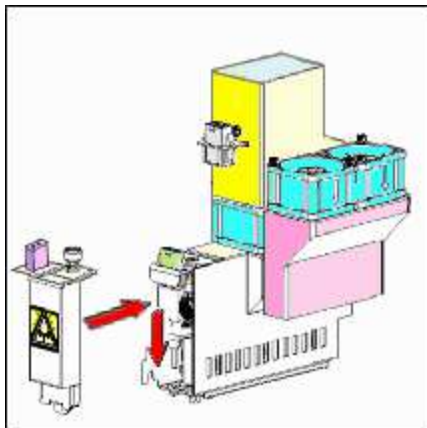


Figure 6-121 Replacing the UV lamp cover

12. Reconnect the power and heat fuse connectors.

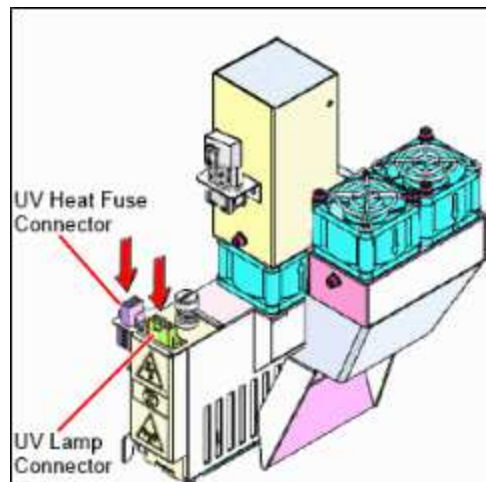


Figure 6-122 Connecting the UV lamp

13. In the wizard screen, confirm that you have replaced the UV lamp(s) and that the black strip is attached, then click Next.

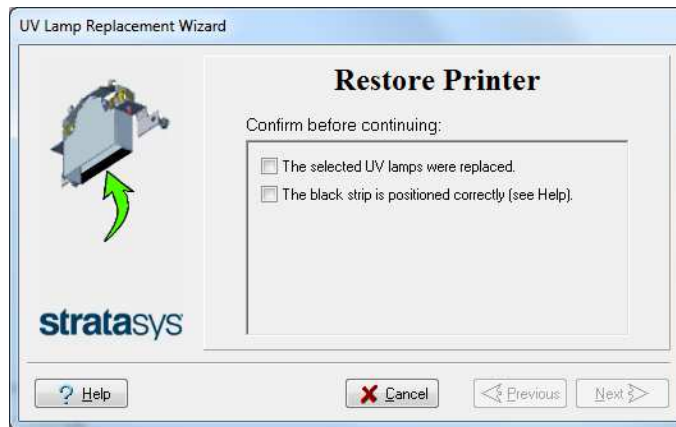


Figure 6-123 UV-installation confirmation screen

The wizard operates the UV lamps and checks if their power is within the acceptable range for each printing mode.

Note: The mode currently being checked appears in the lower-left corner of the printer interface.



Figure 6-124 Status screen during UV lamp check

After replacing a UV lamp, it is recommended that you calibrate its power for the various printing modes. The next screen allows you to continue to the UV Calibration wizard (see "Testing and Calibrating the UV Lamps" on page 6-61).



Figure 6-125 Wizard continuation screen

Built-in Tests

The printer application contains a suite of tests for regularly checking the hardware and software, and for troubleshooting. You can configure basic communications and environment tests to run automatically, when the J750 application opens. In addition, you can run a more comprehensive set of tests before processing a print job, as a system check, to ensure optimum printing results.

Because running the tests affects the operation of the printer, you can only open the Built-in Tests interface when the system is not printing.

The test suite features:

- The organization of printing-related tasks in categories:
 - Communications
 - Data cards
 - Temperatures
 - Voltages
 - Encoder repeatability
 - Print-head heating
 - Print-head filling
- A clear display of test results and the source of any failures, enabling you to determine if printing is possible or worthwhile.
- The ability to monitor test results for specific components.
- Troubleshooting tips.

Running these tests can help identify problems in the printer hardware and software. A large number of hardware defects (or near-defects) warns you of possible printing problems, either for current or future jobs.



Stratasys recommends running the built-in tests in the following cases:

- as a routine test, once every two weeks
- as a system check, before major (long) jobs
- as needed, for troubleshooting

- Accessing
Built-in Tests
- To open the Built-in Tests screen, do one of the following:
- From the *Options* menu, select Built-In Tests.
 - Press Ctrl+Alt+B.



Figure 6-126 Selecting *Built-In Tests* from the *Options* menu

The *Built In Tests* screen lists pre-configured tests, grouped by component categories. In this screen, you select and run tests, and the results are displayed.

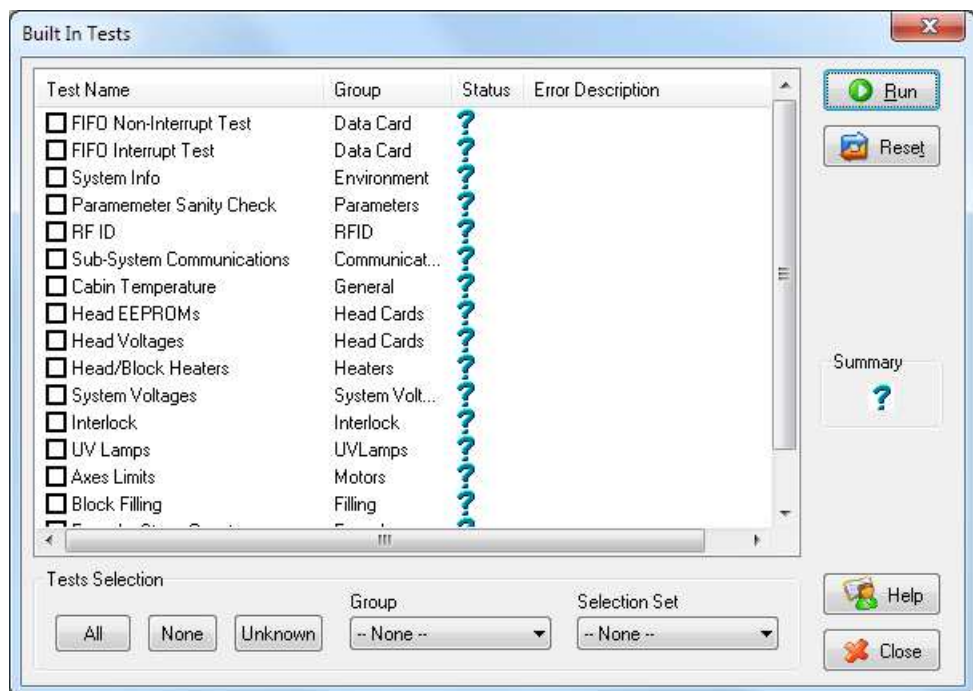


Figure 6-127 *Built In Tests* screen

Test List

Test Name

This column lists all of the tests, together with selection check boxes.

Click the check boxes to select the tests you want to run. To remove a selection, click the check box again. To quickly select all of the tests in a component category, use the *Group* drop-down list at the bottom of the screen.

Group

This column shows the component categories for each test.

This tells you which tests are run when selecting a category from the *Group* drop-down list at the bottom of the screen.

Status

This column shows the results of each test after you run it:

- ✓ Test successfully completed.
- ✗ Test failed.
- ? Unknown results. (The test has not been run yet.)

Test Selection Area

In the *Test Selection* area, at the bottom of the screen, you can quickly select or de-select tests by their characteristics:

| | |
|----------------------|--|
| All | Click to select all of the tests in the list. |
| None | Click to de-select all of the tests in the list. |
| Unknown | Click to select all test that have not been run yet (Status = ?). |
| Group | Use this menu to select tests by component category. |
| Selection Set | Use this menu to select a pre-configured set of tests to run at specified times (computer startup, before printing, etc.). |

Running Built-in Tests

To run the selected tests:

➤ Click  .



After you run a test, the *Save* and *View* command buttons are added to the *Built In Tests* screen.

Test Results To save and view a report of all tests:

- Use the Save and View command buttons.

Command Buttons You click the command buttons, on the right side of the screen, to perform the following operations:



Run

Click to run the selected tests.

Reset

Click to clear previously run tests. This returns the status of each test to *Unknown (?)*.

Save

Click to save a report that summarizes the tests run. The report is saved as an HTML file. You can save any number of reports for the tests you run; the name of the file saved is *BITReport [date][time].htm*. By default, these files are saved in the J750 installation folder, but you can save it in any other folder.

View

Click to display the latest test report that you saved. (You can view other test reports by opening the relevant files in your Web browser. To do so, open Windows Explorer, and double click the *BITReport* file.)

Close

Click to close the *Built-in Tests* screen.

Summary

On the right side of the screen, a symbol represents the combined results of all the tests run, using the symbols from the *Status* column.

- ✓ All tests successfully completed.
- ✗ At least one test failed.
- ? Not all tests performed.

Test Descriptions and Troubleshooting The following table lists the name of each test in the Built-in Tests suite, together with its description and a possible reason for its failure. If you need assistance, contact your Stratasys service provider.

| Test Name | Description | Possible Reason for Failure |
|---------------------------------------|---|---|
| Sub-System Communication | Tests communications between components. | <ul style="list-style-type: none"> • Disconnected communications cable. • Faulty cable. |
| FIFO Non-Interrupt/ FIFO Interrupt | <ul style="list-style-type: none"> • Tests the data queue in the DATA PCI card. • Tests the Windows interrupt. | <ul style="list-style-type: none"> • If both FIFO tests fail: Faulty DATA_PCI card. • If only the FIFO Interrupt test fails: Faulty Windows interrupt. |
| Encoder | Tests the encoder's reliability by comparing readings from multiple runs along the X-axis. | Faulty encoder. |
| System Info | Compares the following parameter values with the minimum requirements. <ul style="list-style-type: none"> • physical memory • available memory • free space on disk • monitor resolution | Failure of RAM memory allocation in the printer computer. |
| RFID | Verifies the presence of RFID tags on all loaded material cartridges, and tests them by writing to and reading from each one. | <ul style="list-style-type: none"> • Faulty RFID reader. • Faulty RFID reader power supply. • Faulty or misaligned RFID tag. • High level of electromagnetic noise around the RFID tag. |
| System Voltages | Checks if the following voltages are within 5% of the required voltage: <ul style="list-style-type: none"> • 40V to the print heads by the VPP power supply • 12V to the height thermistors by the VDD power supply | <ul style="list-style-type: none"> • VPP power supply: Faulty head drive(s). • VDD power supply: Faulty height thermistor(s). |
| Block Filling | Analyzes the thermistor readings when the block is full and when it is empty. | Faulty thermistor. |
| Interlock | Tests the interlock in the printer cover. | <ul style="list-style-type: none"> • Failure of interlock mechanism. • Faulty latch. • Disconnected cable. |
| Cabin Temperature | Tests the temperature level in the build-tray area. | Faulty temperature sensor (OHDB). |
| Head EEPROM | Tests the read/write capabilities of the print-head driver cards. | Faulty print-head driver card(s). |
| Head Voltage | Checks the control of voltages supplied to the print heads. | Faulty print-head driver card(s). |

| Test Name | Description | Possible Reason for Failure |
|------------------------|--|---|
| Head/Block Heaters | Tests the heaters in the print heads and in the print-block body. | Faulty heaters or thermistors. |
| UV Lamps | Tests each UV lamp at the High Quality power level. | Faulty UV lamp. Faulty UV power supply. Disconnected UV cable. |
| Axes Limit | Tests the hardware and software limits of all axes. | Faulty hardware sensors. Wrong <i>Max Position</i> parameter. |
| Parameter Sanity Check | Compares the values of all printer parameters (in cfg files) to the required values. | One or more of the printer parameters is not within the required range. Details appear in the BIT report. |
| Vacuum | Tests the vacuum level in the print block. | <ul style="list-style-type: none"> • Faulty vacuum sensor. • Vacuum leakage. • Wrong parameters. |

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 10 kilograms of waste material—usually enough for several months of printer use. The printer application displays a warning message when there are 9 kilograms of material in the container, and stops the printing when the net weight reaches 9.5 kilograms. Above 9 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 *Maintenance* screen of the printer interface. You can also visually inspect the level of waste in the container. To access it, see page 6-89.

To monitor the waste weight (and other indicators) in the printer:

- In the main printer interface screen, click the display toggle to view the printer indicators.



Figure 6-128 Printer interface, showing waste weight (red background indicates operator alert)

The waste container consists of a plastic container 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 plastic container before you can install it in the printer.



Replacement boxes, plastic containers, and sealing caps are supplied in the J750 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. Place a new plastic container into the box.

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

To replace the waste container:

1. Locate the door on the lower-left side of the printer.
2. Push in the top-center of the door to release the latch and open the door.



Figure 6-129 Accessing the waste container

3. Carefully slide out the waste container to remove it from the printer.
4. Close the full container with the cap supplied with the new waste container.
5. Close the new waste-container box, using tape to hold it closed.
6. Close the waste compartment door.



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

Cleaning the Exterior Panels The painted exterior plastic panels of J750 3D printers have 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

7

Handling Printed Models

| | |
|--|-----|
| Removing Models After Printing | 7-2 |
| Removing the Support Material | 7-2 |
| Post-Printing Treatment for Models Made with VeroClear | 7-4 |
| Photo-Bleaching Instructions | 7-5 |
| Storing Models | 7-5 |

Removing Models After Printing

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

If the printer must be used to produce additional models as soon as possible:

1. Let the printed models cool on the build tray for at least 10 minutes.
2. Very carefully, remove the models from the tray with a scraper or spatula (supplied in the tool kit), taking care not to pry or bend the model.



Warning:

Wear protective gloves when handling printed models before they are washed.

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

Removing the Support Material

After printed models have cooled, the support material must be removed. This can be done by different methods, depending on the type of support material, the size of the model, how delicate it is, the amount and location of the support material, and other factors. Use the following methods as a guide, and adapt them (or a combination of them) for finishing the models you are handling.

There are two types of support material available:

- SUP705 (FullCure705), a gel-like support material.
- SUP706, an easily removed support material that dissolves in a solution of caustic soda and sodium metasilicate.

SUP705 (FullCure705) and SUP706 can be removed from printed models using the following methods, in this order:

1. by hand
2. water pressure (in a suitable cleaning unit)
3. SUP705: 1% caustic soda solution (recommended for a smooth finish)
SUP706: 2% caustic soda and sodium metasilicate solution

Removing
Excess Support
Material by
Hand

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

- For SUP705, after breaking away excess support material, soak the model in a 1% caustic soda solution (see "Removing SUP705 with Caustic Soda" on page 7-3).
- For SUP706, after breaking away excess support material, soak the model in a 2% caustic soda and sodium metasilicate solution (see "Removing SUP706 with Caustic Soda and Sodium Metasilicate" on the next page).

Removing Support Material with Water Pressure

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

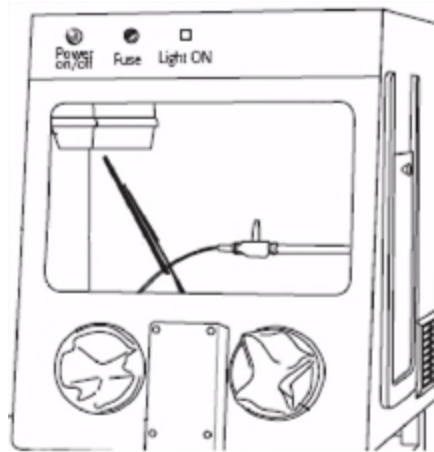


Figure 7-1 Balco WaterJet Cleaning Unit

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



Use caution when cleaning delicate models with high-pressure water systems.

Removing SUP705 with Caustic Soda

Soak models in a 1-percent solution of caustic soda (sodium hydroxide) to remove support material from difficult-to-reach areas and to give the model a smooth, clean finish. The amount of time you soak the model 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 model 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 models soaked in it.

Removing SUP706 with Caustic Soda and Sodium Metasilicate

Soak models in a 2-percent solution of caustic soda (sodium hydroxide) and sodim metasilicate (Na_2SiO_3) to remove support material. The amount of time you soak the model in the solution depends on how delicate it is and how much support material needs to be removed. Rinse the model thoroughly under running water afterwards.



SUP706 will dissolve into the caustic soda and sodium metasilicate solution and saturate it, reducing its effectiveness. Replace the solution when the Support material reaches 15% of the solution (after approximately one month of average use).

**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 models soaked in it.

Post-Printing Treatment for Models Made with VeroClear

Models made with VeroClear (RGD810) have a slight yellow tint when removed from the printer. This is especially true for models printed with a glossy finish. The yellow tint fades naturally over time, but you can greatly accelerate this process by using a suitable photobleaching treatment.

As a rule, best clarity is achieved when parts are printed with a matte finish, and treated as explained below.

Photobleaching models involves exposing them to light. To achieve highly controlled and predictable results, a professional illumination chamber is recommended. However, adequate results may be obtained using ordinary desk lamps fitted with suitable fluorescent elements.



Figure 7-2 **Left:** Illumination chamber; **Right:** Desk lamps

Photo-Bleaching Instructions

Follow these instructions for photobleaching printed models.

- The fluorescent lamps should be rated 45W, 6500K.
- When using desk lamps, place the models in a container lined with aluminum foil. Use at least two lamps, more when treating models in a large container.
- Arrange the models with enough space between them to allow light to reach all sides of each model.
- Verify that the ambient temperature around the models is approximately 40°C (104°F). Higher temperatures may cause model distortion; lower temperatures may not produce satisfactory results. When using desk lamps, you can achieve the required temperature by positioning the lamps approximately 10 cm (4 in.) above the models.
- Inspect the models after six hours of treatment.
 - For parts with a matte finish, this should be enough. Polish and lacquer the parts.
 - For parts with a glossy finish, continue the photobleaching treatment for up to 18 hours more.

In Stratasys laboratories, there was a tint reduction of approximately 70% within six hours. After 24 hours, tint was reduced by approximately 90%.



More information about this treatment is available in the application note *VeroClear RGD810 Model Material*.

Storing Models

Models 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 printed models at room temperature and in a low-humidity environment.
- Do not expose models to direct sunlight and other heat sources.