HP Jet Fusion 580 Color 3D Printer
Product Documentation
User Guide

SUMMARY

How to use your product.

Legal notices

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Edition 9

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Safety notice

Read and follow the operating and safety instructions before turning on the printer.

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1 Welcome to your MJF system

Documentation

The following documents are available:

- Site preparation guide
- Introductory information
- User guide (this document)
- Videos supplementing the user guide
- Legal information
- Limited warranty

Product usage requirements

The products, services, and consumables are subject to the following additional terms:

- The customer agrees to use only HP Branded Consumables and HP Certified Materials in the 3D HP printer product, and understands that use of any consumables other than HP consumables may cause serious product functionality and/or safety issues, including, but not limited to those outlined in the user guide. The customer agrees not to use the product and/or consumables for uses not permitted by US, EU, and/or other applicable law.
- The customer agrees not to use the product and/or consumables for the development, design, manufacture, or production of nuclear weapons, missiles, chemical or biological weapons, and/or explosives of any kind.
- The customer agrees to comply with the connectivity requirement outlined below.
- The customer may use firmware embedded in the product only to enable the product to function in accordance with its published specifications.
- The customer agrees to comply with the user guide.

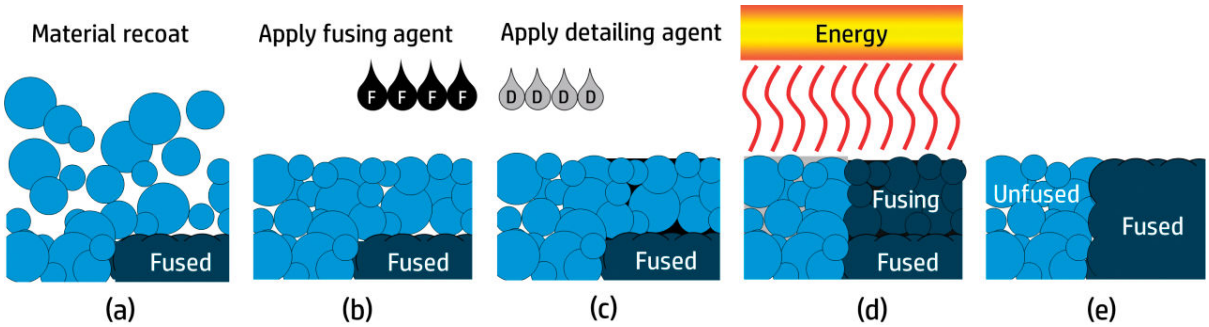
Products, services, and/or technical data provided under these terms are for the customer's internal use and not intended for further resale.

MJF technology

HP Multi Jet Fusion technology offers control over part and material properties and speed advantages beyond those found in other 3D printing technologies.

The HP MJF printing process begins by depositing a thin layer of material in the printer's work area. Next, the carriage containing an HP Thermal Inkjet array passes over the full work area, printing chemical fusing, detailing,

and coloring agents. During another pass of the carriage, the work area is exposed to fusing energy, which bonds part layers together. The process continues, layer-by-layer, until a complete part is formed.



- The material is recoated across the work area.
- A fusing agent (F) is selectively applied where the particles are to fuse together.
- A detailing agent (D) is selectively applied where the fusing action needs to be reduced or amplified. In this example, the detailing agent reduces fusing at the boundary to produce a part with sharp and smooth edges.
- The work area is exposed to fusing energy.
- The part now consists of fused and unfused areas.

The process is repeated until the complete part has been formed.

NOTE: The sequence of steps above is typical, but may be changed in specific hardware implementations.

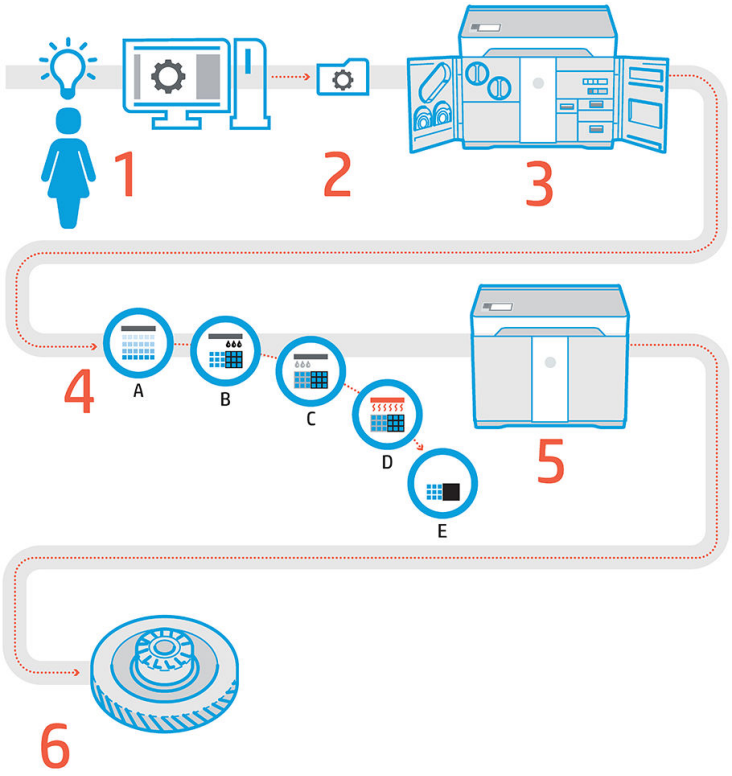
By leveraging proven HP Thermal Inkjet technology and HP's in-depth technical knowledge of rapidly and accurately placing precise, minute quantities of multiple types of fluids, MJF enables customers to produce highly detailed parts and prototypes.

As agents are deposited point-by-point across each cross-section of each part, MJF technology can transform part properties at each voxel, or volumetric pixel.

For example, when printing in color, MJF technology selectively prints color at the voxel level with cyan, magenta, yellow, and black agents.

With MJF technology, HP will enable customers to realize the full potential of 3D printing.

Usage recommendations



1. **Prepare design:** Open your 3D model(s) and check for errors in the easy-to-use HP SmartStream 3D Build Manager software.
2. **Pack models and send to printer:** Arrange your 3D models in the HP SmartStream 3D Build Manager and submit the job to the printer.
3. **Prepare printer:** Clean your printer, check your long-term consumables, automatically check mechanical systems.
4. **Printing with voxel-level control:** Just tap **Start** to start building parts with extreme dimensional accuracy and fine detail, thanks to HP's unique multi-agent printing process.
5. **Automated material management:** Unused material is automatically reclaimed and stored to be reused in the next print job.
6. **Retrieve and clean parts:** The beacon and front panel indicate when parts are ready for retrieval. Retrieve your parts from the build chamber and remove excess material with a bead and air blast system.

2 Safety precautions

Introduction

Before using the printer, read the following safety precautions and operating instructions to make sure you can use it safely.

You are expected to have the appropriate technical training and experience necessary to be aware of hazards to which you may be exposed in performing a task, and to take appropriate measures to minimize the risks to yourself and to others.

Perform the recommended maintenance and cleaning tasks to ensure the correct and safe operation of the printer.

The printer is stationary, and should be located in a restricted-access area, for authorized personnel only.

General safety guidelines

Turn off the printer, using the branch circuit breakers located in the building's Power Distribution Unit (PDU), and call your support representative (see When you need help on page 179) in any of the following cases:

- The power cord is damaged.
- The heating and fusing lamp enclosures are damaged, the glass is missing or broken, or the sealing is defective.
- The printer has been damaged by an impact.
- Condensation has entered the printer.
- There is smoke or an unusual smell coming from the printer.
- Fuses have blown.
- The printer is not operating normally.
- There is any mechanical or enclosure damage.

Turn off the printer using the branch circuit breakers in either of the following cases:

- During a thunderstorm
- During a power failure

Take special care with zones marked with warning labels.

Use HP-certified and HP-branded material and agents only. Do not use unauthorized third-party material or agents.

In case of unexpected malfunction, anomaly, ESD (ElectroStatic Discharges), or electromagnetic interference, press the emergency stop button and disconnect the printer. If the problem persists, contact your support representative.

The print-production area in which the printer is installed should be free from liquid spillage and environmental condensation. The operating climatic conditions should be maintained within the specified ranges for both product and material (see the site preparation guide for the specified ranges).

The printer should always be kept within rated environmental conditions.

Ensure that there is no condensation inside the printer before turning it on.

To repair or reinstall the printer, contact your nearest authorized service provider. Do not repair, disassemble, or replace any part of the printer or attempt any servicing yourself, unless specifically recommended in the user-maintenance instructions or in published user-repair instructions that you understand and have the skills to carry out. Do not use any part other than original HP spare parts. Unauthorized attempts at repair may result in electric shock, fire, printer malfunction, or injury.

Final parts/builds

The customer assumes all risk relating to or arising from the 3D printed parts.

The customer is solely responsible for the evaluation of and determination of the suitability and compliance with applicable regulations of the products and/or 3D printed parts for any use, especially for uses (including but not limited to medical/dental, food contact, automotive, heavy industry, and consumer products) that are regulated by US, EU, and other applicable governments.

Explosion hazard

⚠ **WARNING!** Dust clouds can form explosive mixtures with air. Take precautionary measures against static charges, and keep away from sources of ignition.

NOTICE: The printer is not intended for hazardous locations or ATEX classified zones: ordinary locations only.

To avoid the risk of explosion, take the following precautions:

- Smoking, candles, welding, and open flames should be forbidden close to the printer or material storage area.
- Inside and outside the printer should be cleaned regularly with an explosion-protected vacuum cleaner to avoid dust accumulation. Do not sweep the dust or or try to remove it with a compressed-air gun.
- An explosion-protected vacuum cleaner certified for collection of combustible dust is required for cleaning. Take measures to mitigate material spillage and avoid potential ignition sources such as ESD (ElectroStatic Discharges), flames, and sparks. Do not smoke nearby.
- The printer and accessories must be properly grounded at mains outlets only; do not manipulate internal bonding. If static discharges or electrical sparks are noticed, stop operation, disconnect the printer, and contact your support representative.
- Check the air filters and the sealing of the heating lamps regularly.
- Use HP-certified and HP-branded material and agents only. Do not use unauthorized third-party material or third-party agents.

- HP recommends the use of HP accessories for retrieving 3D parts and refilling the build chamber. If other methods are used, read the following notes:
  - Dust clouds generated during handling and/or storage can form explosive mixtures with air. Dust explosion characteristics vary with the particle size, particle shape, moisture content, contaminants, and other variables.
  - Check that the printer is properly grounded and installed to satisfy electrical classification requirements. As with any dry material, pouring this material or allowing it to fall freely or be conveyed through chutes or pipes can accumulate and generate electrostatic sparks, potentially causing ignition of the material itself, or of any flammable materials which may come into contact with the material or its container.
- Material storage, handling, and disposal as per local laws. See the Safety Data Sheets at http://www.hp.com/go/msds for adequate handling and storage. Follow your Environmental, Health, and Safety processes and procedures.
- Do not place the printer in a hazardous location area, and keep it separated from other equipment that could create a combustible dust cloud during its operation.
- Auxiliary post-processing equipment, such as for bead blasting, must be suitable for combustible dust.
- Stop operation immediately if sparks or material spillages are seen, and call your support representative before continuing.
- All personnel, when handling combustible dust, should be freed from static electricity by using conductive or dissipative footwear and clothing, and a conductive floor.

Electrical shock hazard

⚠ **WARNING!** The internal circuits inside the e-cabinet, and the heating and fusing lamps, operate at hazardous voltages capable of causing death or serious personal injury.

Turn off the printer using the branch circuit breakers located in the building's Power Distribution Unit (PDU) before servicing. The printer must be connected to earth at mains outlets only.

To avoid the risk of electric shock:

- Do not attempt to dismantle the internal circuit enclosures, heating or fusing lamps, or e-cabinet except during hardware maintenance tasks. In that case, follow the instructions strictly.
- Do not remove or open any other closed system covers or plugs.
- Do not insert objects through slots in the printer.

NOTE: A blown fuse may indicate malfunctioning electrical circuits within the system. Call your support representative (see When you need help on page 179), and do not attempt to replace the fuse yourself.

Heat hazard

The heating, fusing, and build-chamber subsystems of the printer operate at high temperatures. To avoid personal injury, take the following precautions:

- Take special care when accessing the printing area. Let the printer cool down before you open the covers.
- Take special care with zones marked with warning labels.
- Do not place objects inside the printer while operating.
- Do not cover enclosures while operating.
- Remember to let the printer cool down before performing some maintenance operations.
- Wait for at least the minimum cooling time before retrieving parts from the printer. HP recommends wearing safety gloves to retrieve parts after printing, as the parts may be hot.

Fire hazard

The heating, fusing, and build-chamber subsystems of the printer operate at high temperatures. Call your support representative if the fuses are repeatedly blowing.

To avoid the risk of fire, take the following precautions:

- Use the power supply voltage specified on the nameplate.
- Connect the power cord to a dedicated line, protected by a branch circuit breaker according to the information detailed in the site preparation guide.
- Do not insert objects through slots in the printer.
- Take care not to spill liquid on the printer. After cleaning, make sure all components are dry before using the printer again.
- Do not use aerosol products that contain flammable gases inside or around the printer. Do not operate the printer in an explosive atmosphere.
- Do not block or cover the openings of the printer.
- Do not attempt to modify the heating, fusing, build chamber, e-cabinet, or enclosures.
- Proper maintenance and genuine HP consumables are required to ensure that the printer operates safely as designed. The use of non-HP consumables may present a risk of fire.
- Take special care with zones marked with warning labels.
- Do not place objects covering top cover, enclosures, or air ventilation.
- Do not leave tools or other materials inside the printer after maintenance or servicing.

Suitable materials for fire-fighting include carbon dioxide, water spray, dry chemicals, or foam.

⚠ **CAUTION:** Do not use a jet of water, as it could scatter and spread the fire.

⚠ **WARNING!** Depending on the material used, some unhealthy substances can be released into the air in case of incidental fire. Wear self-contained pressure-demand breathing apparatus and full protective gear. Your EHS specialist should consult the Safety Data Sheet (SDS) about each material, available at http://www.hp.com/go/msds, and advice on the appropriate measures for your location.

Mechanical hazard

The printer has moving parts that could cause injury. To avoid personal injury, take the following precautions when working close to the printer.

- Keep your clothing and all parts of your body away from moving parts.
- Avoid wearing necklaces, bracelets, and other hanging objects.
- If your hair is long, try to secure it so that it will not fall into the printer.
- Take care that sleeves or gloves do not get caught in moving parts.
- Avoid standing close to the fans, which could cause injury and could also affect print quality (by obstructing the air flow).
- Do not operate the printer with covers bypassed.

Light radiation hazard

Infrared (IR) radiation is emitted from the heating and fusing lamps. The enclosures limit radiation in compliance with the requirements of the exempt group of IEC 62471:2006, *Photobiological safety of lamps and lamp systems*. Do not modify the top cover enclosure, nor the glasses or windows.

Chemical hazard

See the Safety Data Sheets available to identify the chemical ingredients of your consumables (material and agents). Sufficient ventilation needs to be provided to ensure that potential airborne exposure to these substances is adequately controlled. Consult your usual air conditioning or EHS specialist for advice on the appropriate measures for your location.

http://www.hp.com/go/msds

Use HP-certified material and agents only. Do not use unauthorized third-party material or third-party agents.

⚠ **WARNING!** Hazardous substances could be released when processing material. To avoid this risk, please follow the instructions recommended in the Site Preparation Guide's "*Ducts and HVAC recommendation*" section.

⚠ **WARNING!** Hazardous substances—in the form of Volatile Organic Compounds (VOC) from agents—could condense on surfaces. To avoid the risk of chemical contact, wear personal protective equipment or ensure you have the minimum ventilation required in the room.

Ventilation

Fresh air ventilation is needed to maintain comfort levels. For a more prescriptive approach to adequate ventilation, you could refer to the latest edition of the ANSI/ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) document *Ventilation for Acceptable Indoor Air Quality*.

Adequate ventilation needs to be provided to ensure that potential airborne exposure to materials and agents is adequately controlled according to their Safety Data Sheets.

Ventilation should meet local environmental, health, and safety (EHS) guidelines and regulations.

Follow the ventilation recommendations in the site preparation guide.

NOTE: The ventilation units should not blow air directly onto the printer.

Air conditioning

As with all printer installations, to maintain ambient comfort levels, air conditioning in the work area should take into account that the printer produces heat. Typically, the printer's power dissipation is in the range of 4–6 kW (13.6–20.5 kBTU/h).

Air conditioning should meet local environmental, health, and safety (EHS) guidelines and regulations.

NOTE: The air conditioning units should not blow air directly onto the printer.

An HVAC unit is required which can consistently maintain the recommended operating temperature in order to achieve optimal printing performance. More specific technical information can be found in the site preparation guide.

Sound pressure level

The HP VCVRA-1804 maximum A-weighted sound pressure level over bystander positions while printing is 80 dB(A). Hearing protection may be required as per local laws; consult your EHS specialist.

Printer transport hazard

Special care must be taken to avoid personal injury when moving the printer.

- Move the printer over smooth, flat surfaces without steps.
- Move with care and avoid shocks during transport, which could spill the material.
- Lock the front casters when not moving the printer. Remember to unlock them before moving it.

If you move the printer between different rooms, bear in mind that it should be kept in constant environmental conditions, and recalibrated when it reaches its new location: recalibrate the load cells, check the spacing between the spreader roller and the preheat plate, and check printhead alignment, realigning if necessary.

3D part retrieval

Wear heat-resistant gloves when retrieving 3D printed parts manually. Safety gloves are also recommended when retrieving 3D printed parts after auto-extraction, as the parts may still be hot.

Personal protective equipment

HP recommends the following equipment, which may be used for material handling and certain maintenance and cleaning tasks:

1. A pair of heat-resistant gloves per person.
2. Conductive or electrostatic-dissipative footwear and clothing.

3. Mask or goggles if the environment is dusty.
4. Hearing protection if necessary.
5. Chemical protection gloves to clean possible condensates.

Use of tools

No tools are required for daily operations including printer settings, printing, retrieving and refilling, replacement of agent intermediate tanks, and daily checks.

Hardware maintenance tasks and replacement of Customer Self-Replaceable (CSR) parts may require the maintenance key or a screwdriver. For more information, see Maintenance on page 105.

NOTE: During installation, the designated personnel receive training for the safe operation and maintenance of the printer. The printer should not be used without this training.

Warnings and cautions

The following symbols are used in this manual to ensure the proper use of the printer and to prevent it from being damaged. Follow the instructions marked with these symbols.

⚠ WARNING! Failure to follow the guidelines marked with this symbol could result in serious personal injury or death.

⚠ CAUTION: Failure to follow the guidelines marked with this symbol could result in minor personal injury or damage to the product.

Warning labels

Table 2-1 Warning labels

Label	Explanation
 For service personnel only	**Electric shock hazard** Heating modules operate at hazardous voltage. Disconnect power source before servicing. CAUTION: Refer servicing to qualified service personnel. In case of operation of the fuse, parts of the printer that remain energized may represent a hazard during servicing. Before servicing, turn off the printer using the Branch Circuit Breakers located in the building's Power Distribution Unit (PDU). WARNING! High leakage current. Current leakage may exceed 3.5 mA. Earth connection essential before connecting supply. Equipment to be connected to earthed mains only. See installation instructions before connecting to the supply. Ensure that the input voltage is within the printer's rated voltage range. **Before starting** Read and follow the operating and safety instructions before starting the printer.

Table 2-1 Warning labels (continued)

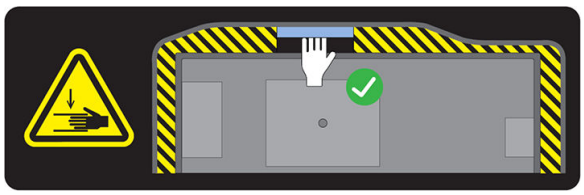
Label	Explanation
	Risk of burns. Let the printer cool down before accessing internal parts.
	Wear heat-resistant gloves when retrieving parts, either through manual extraction or after material reclamation. The parts may be very hot. You are required to wear gloves when handling material cartridges, agents, printheads, the printhead cleaning roll, and when performing maintenance and cleaning tasks. Chemical protection gloves are suitable, and should be tested according to EN 374. Glove material: NBR (nitrile rubber). Thickness > 0.11 mm (0.0043 in). Breakthrough time > 480 minutes.
	You are recommended to wear a safety mask when replacing filters.
	You are required to wear tightly fitting safety goggles when replacing filters and for maintenance and cleaning tasks.
	Crush hazard. Keep your hands clear of the edge of the top cover. Open and close the top cover using the handle (highlighted in blue) only.
	WARNING! Dust clouds can form explosive mixtures with air. Take precautionary measures against static charges, and keep away from sources of ignition. No smoking, matches, or open flames close to printer or material storage area.

Table 2-1 Warning labels (continued)

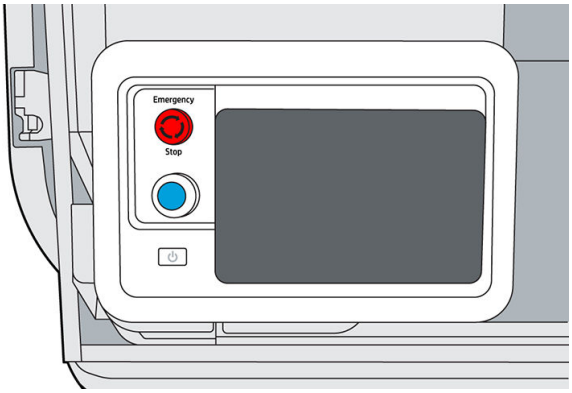
Label	Explanation
	An explosion-protected vacuum cleaner certified for collection of combustible dust is required for cleaning. Take measures to mitigate material spillage and avoid potential ignition sources such as ESD (ElectroStatic Discharges), flames, and sparks. Do not smoke nearby. Disposal as per local laws.
 For maintenance and service personnel only	Electric shock hazard. Disconnect power before servicing. Heating modules and electrical cabinets operate at hazardous voltage.
 For maintenance and service personnel only	Hazardous moving parts. Keep away from moving fan blades.
 For maintenance and service personnel only	Risk of trapped fingers. Do not touch gears while moving: your hands may be trapped between the gearwheels.
 For service personnel only	Hazardous moving parts. Keep away from the moving printhead, lamp, and heater carriages. When printing, the print carriage travels back and forth.
	Identifies the Protective Earth (PE) terminal for qualified electricians, and bonding terminals for maintenance/service personnel only. An earth connection is essential before connecting to the supply.

Table 2-1 Warning labels (continued)

Label	Explanation
	Do not disconnect the hoses during the purging process.

Emergency stop button

There is a red emergency stop button on top of the printer, beside the front panel. If an emergency occurs, simply push the emergency stop button to stop all processes.



The printer carriages, the fans, and the lamp module are halted; the top cover is locked until the internal temperature decreases. A system error message is displayed.

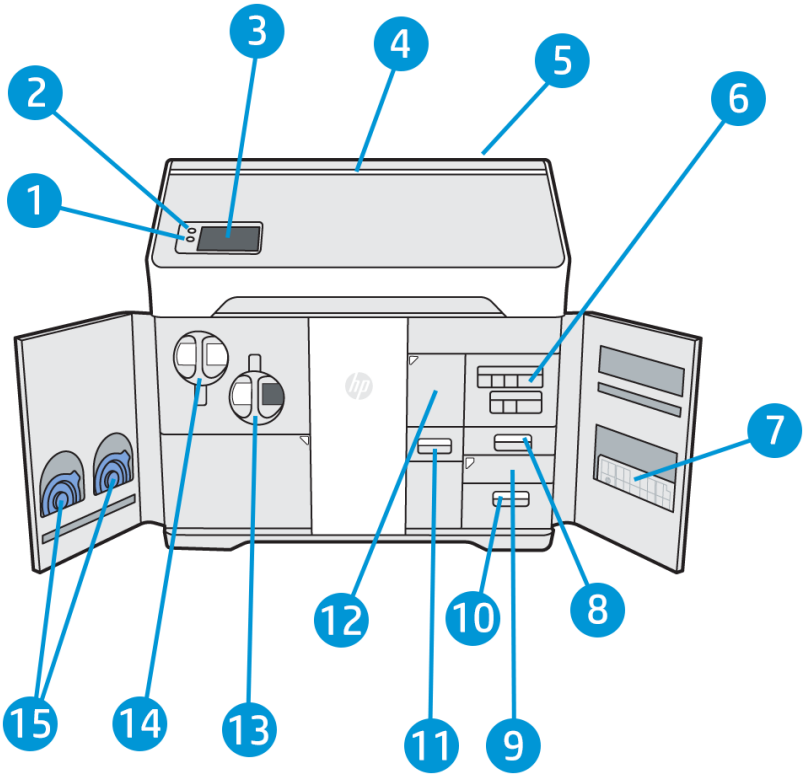
Ensure that the emergency stop button is released before restarting the printer.

For safety reasons, access to the print zone is not permitted while printing is in progress. Let the printer cool down before touching anything inside it.

To stop the printer completely, turn it off.

3 Main components

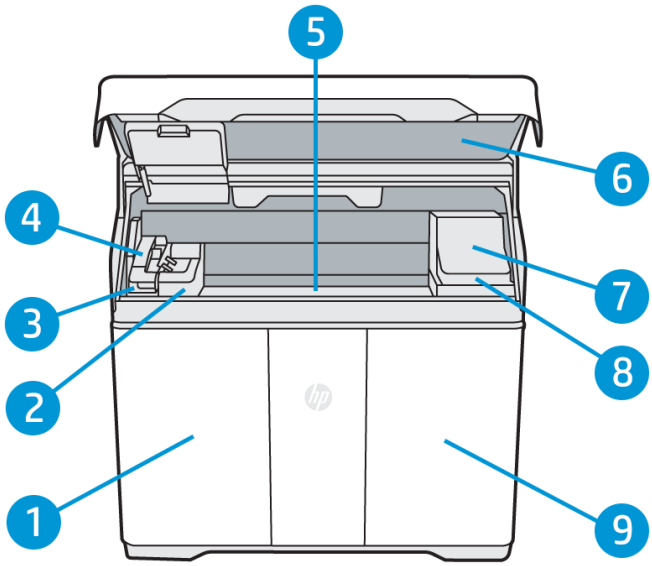
Printer



1. Rearm button
2. Emergency stop button
3. Front panel
4. Status beacon (500 series only)
5. Air intake filter (behind the printer)
6. Agent cartridges
7. Alignment plate
8. Distilled water tank (B3)
9. Scanner (B4)
10. Air exhaust compartment and filter (B5)

11. Material reclamation sieve (B2)
12. Material reclamation filter (B1), and access to the reclamation intermediate tank
13. Reusable material cartridge
14. Fresh material cartridge
15. Cartridge caps

The power button is beside the front panel, just below the rearm button.



1. Material door
2. Fusing lamp
3. Recoating roller and cover
4. Fusing carriage (C1)
5. Build platform and build chamber
6. Top cover and viewing window (500 series only)
7. Print carriage (C2)
8. Printhead cleaning roll (under the print carriage)
9. Agent door

Front panel

The front panel is a touch-sensitive screen situated on the front left of the printer.

The front panel gives you complete control of your printer: from the front panel, you can view information about the device, change device settings, monitor device status, and perform tasks such as supplies replacement and printhead alignment. The front panel displays alerts (warning and error messages) when necessary.

It includes the following components:

1. A Hi-Speed USB 2.0 host port, intended for connecting a USB flash drive, which can provide firmware update files to the printer; it is located behind the front panel, accessible when the front panel is tilted up.
2. The front panel itself: an 8 inch, full-color, touch-sensitive screen with a graphical user interface
3. The loudspeaker

The front panel has a large central area to display dynamic information and icons. On the left side you can see one or two fixed icons.

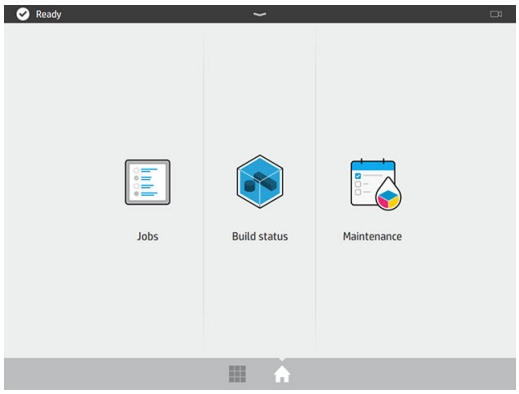
Left fixed icons

- Tap ⌂ to return to the home screen.
- Tap ⮌ to go back to the previous screen. This does not discard any changes made in the current screen.

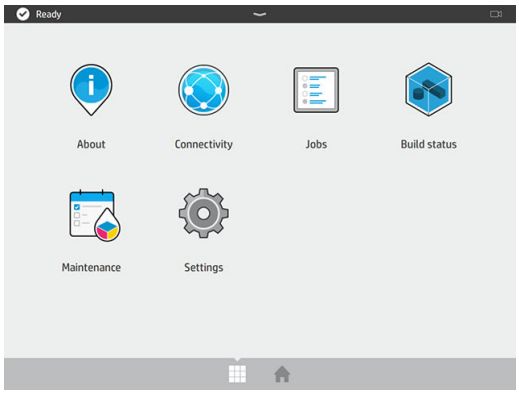
Home screens

There are two top-level screens that you can move between by swiping your finger across the screen, or tapping the appropriate icon at the bottom of the screen:

- The first main screen provides direct access to the most important functions. It can be displayed by tapping ⌂ at the bottom of the screen.



- The all-app screen displays a list of all available apps. It can be displayed by tapping at the bottom of the screen.



Status center

At the top of the front panel is the status center, which can be expanded by swiping down from the top. This is visible on almost all screens, except when an action is taking place. In the status center, you can see the status of the printer, and access various controls and alerts.

Status beacon (500 series only)

The printer has a beacon strip across the top cover; it gives a summary of the printer and job status, which can be seen from a distance.

IMPORTANT: The information provided in the beacon is for functional information purposes only, and is not relevant to your safety. Warning labels on the printer should always be heeded, regardless of the status indicated by the beacon lights.

Table 3-1 Status beacon

Specifications	Descriptions
Beacon off	The printer is ready for the next job.
White moving light	The printer is in the middle of a process.
White light	The printer has completed a process and is waiting for you.
Blue moving light	The printer is printing a job.

Table 3-1 Status beacon (continued)

Specifications	Descriptions
Blue light	A job is complete and the parts are ready to be retrieved.
Red light	The printer is unable to print because of a system error; a job may have been canceled.

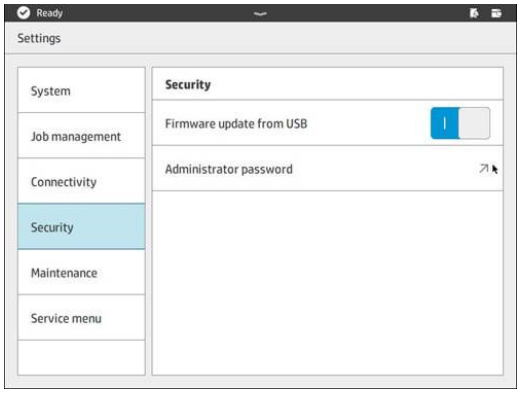
Change system options

You can change various printer system options from the front panel. Tap , then **System**.

- **Language** to change the language in which the printer operates.
- **Select altitude** to tell the printer its height above sea level.
- **Display brightness** to change the brightness of the front-panel display. The default brightness is 50.
- **Speaker volume** to change the volume of the printer's loudspeaker. Select **Off**, **Low**, or **High**.
- **Time zone** to view or set the printer's time zone.
- **Printer logs** to request detailed troubleshooting information about system errors, system warnings, printheads, or agents.
- **Restore factory settings** to restore the printer settings to their original values as set in the factory. This option restores all of the printer settings except the Gigabit Ethernet settings and paper presets.
- **Unit selection** to select between imperial and metric measurements for your printer.

Set the administrator password

You can set the administrator password from the front panel. Tap , then **Security** > **Manage password**, and enter the password. If a password has already been set, you will need to give the old password in order to set a new one.



The administrator password must be given in order to change printer settings.

Log out and log in

If you are logged in as Administrator and you want to access other restricted areas for that username, first you have to log out of that session, because the administrator session doesn't guarantee access to all the menus in the printer.

1. Go to the Notification Center by dragging down the bar located on the upper part of the screen.
2. Tap the **Log out** button in the upper right hand corner of the screen and answer yes to the "Logout session?" dialog.
3. Enter the Settings application and tap the **Service menu** node.
4. Verify that the selected username is "Service," and enter the correct password.

Software

HP SmartStream 3D Command Center

HP Smartstream 3D Command Center is a client application that fully monitors your HP 3D printers, and all other complementary devices such as processing stations and build units, to fully utilize the power of the HP 3D ecosystem. Command Center must be installed with your 3D devices. It helps you to make all of your 3D printing builds successful: review print jobs and be ahead of the printer's needs by remotely viewing firmware updates, warnings, and errors.

HP Smartstream 3D Command Center software, manuals, and support for your 3D printing solution can be downloaded from:

- http://www.hp.com/go/SmartStream3DCommandCenter/software
- http://www.hp.com/go/SmartStream3DCommandCenter/manuals
- http://www.hp.com/go/SmartStream3DCommandCenter/support

For more information about the Command Center, see the *HP SmartStream 3D Command Center User Guide*.

HP SmartStream 3D Build Manager

Use the powerful 3D print-preparation capabilities of HP SmartStream 3D Build Manager to help make all of your 3D printing jobs successful:

1. Add parts to begin preparing the print job.
2. Rotate, size, and position the part on the build platform.
3. Add, change, or remove part color.
4. Automatically locate and fix 3D geometry errors.
5. Send a printer-ready file to a connected 3D printer or save the printable file.

HP Smartstream 3D Build Manager software, manuals, and support for your 3D printing solution can be downloaded from:

- http://www.hp.com/go/SmartStream3DBuildManager/software
- http://www.hp.com/go/SmartStream3DBuildManager/manuals
- http://www.hp.com/go/SmartStream3DBuildManager/support

For more information about the Build Manager, see the *HP SmartStream 3D Build Manager User Guide*.

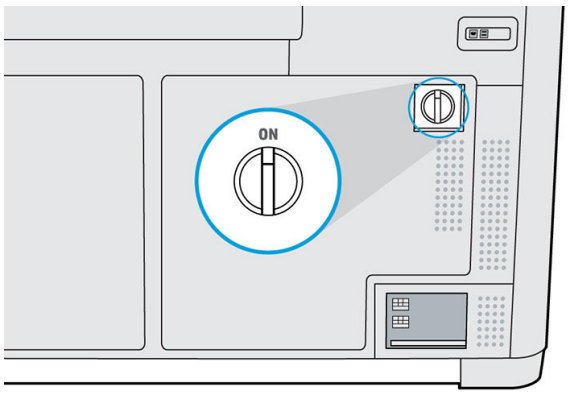
4 Power on and off

NOTICE: Operate the printer only within the specified ranges of operating temperature and humidity (see the site preparation guide). If the printer or supplies are exposed to conditions outside the environmental operating range, wait at least 12 hours for everything to reach environmental operating conditions before turning on the printer or using the supplies.

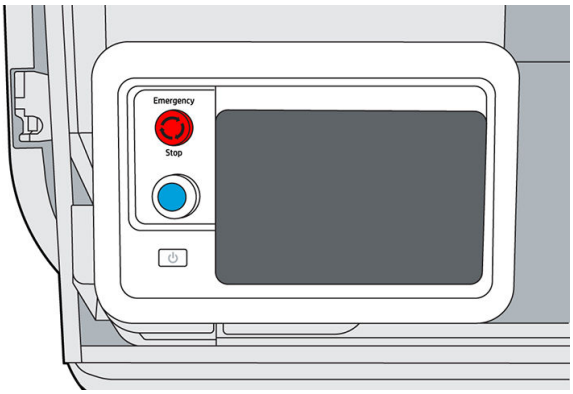
Turn the printer on and off

Turn on the printer for the first time

1. Ensure that the printer's doors are all closed.
2. Turn the main switch at the rear of the printer to the on position.



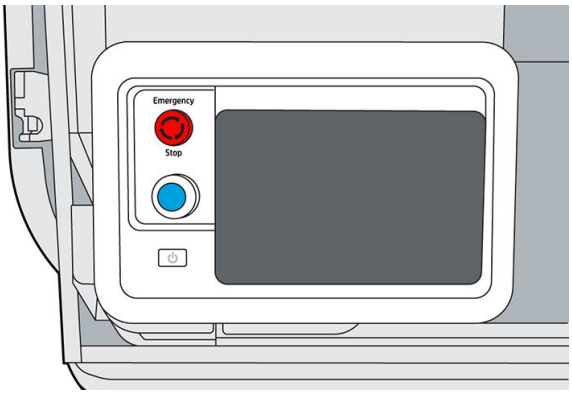
3. Wait for the front panel to tell you that the printer is waiting for rearm.
4. Perform a visual check of the printer.
5. When requested, press the blue rearm button beside the front panel, at the front left of the printer. This enables all of the printer's high-power subsystems.



6. Wait for the front panel to indicate that the printer is ready. This can take several minutes. When initialization is complete, the front panel displays a ready message. If a system error message is displayed, see System errors on page 178.

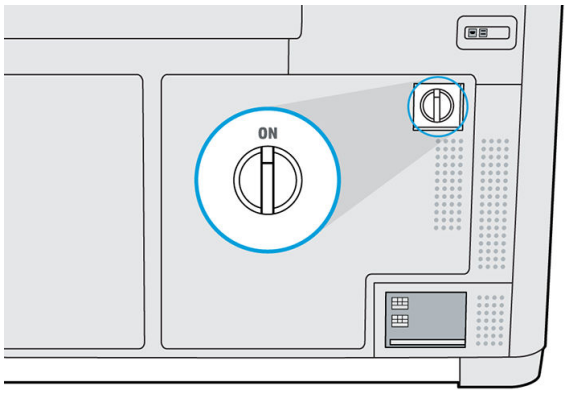
Turn the printer on and off

Use the ⏻ button beside the front panel to turn the printer on and off.



To turn off the printer for an extended period of time, first turn it off with the ⏻ button; wait for it to shut down completely; then turn off the main switch at the rear of the printer.

Main power switch



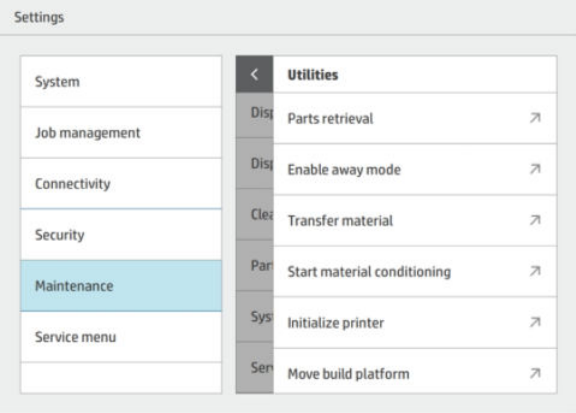
Leave the main power switch on at all times, unless you intend to move the printer.

If you plan to leave the printer unattended for more than 1 week, set it to away mode.

Away mode

If you plan to leave the printer unattended for more than 1 week, select **Away mode** from the maintenance menu under **System Tools** > **Utilities**. The printer will perform a series of minor maintenance tasks in order to maintain the health of your printheads.

After every job task, prepare the printer for the extended idle time by performing the maintenance operations listed under Printer maintenance schedule on page 110. Also clean the capping station.



Entering away mode is preferable to shutting the printer down completely. It will minimize the frequency of printhead replacement, as well as help maintain steady operating procedures with predictable costs based on usage.

The printer will remain locked throughout away mode; it can be returned to normal operation from the front panel. More information about the need for and the details of away mode can be found on the 3D Knowledge Zone.

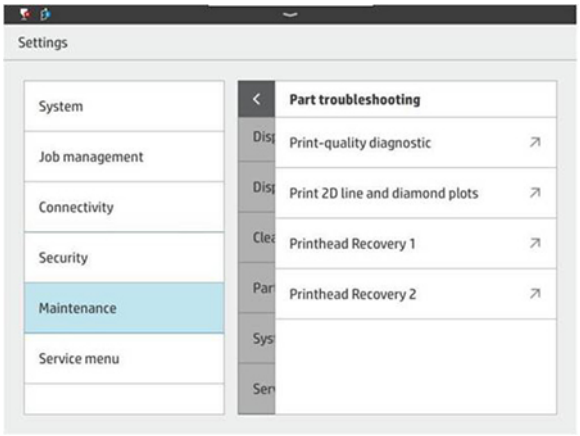
Starting in Firmware V500300_07_20_39.12, during Away Mode, the printer will also execute a sanitization routine in the Humidity System. Also, the shutdown confirmation screen will remind customers to put the printer in Away Mode if the printer will be idle for more than a week. To set the printer in Away mode, select **Cancel**, then go to **Settings**, select **Maintenance** > **System tools** > **Utilities** > **Enable away mode**. Reboot (power cycle) the unit first, before enabling Away Mode.

⚠ CAUTION: If you turn off the printer for an extended amount of time, it cannot maintain printhead nozzle health, and you may find that you need to replace the printheads when you eventually turn it back on.

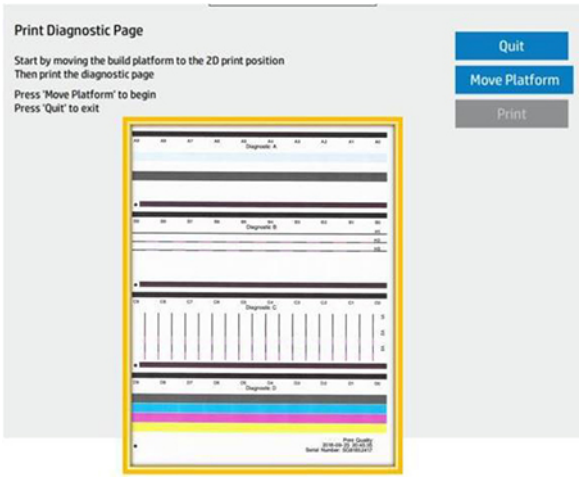
Recommendations upon returning from an idle period

The following steps provide the complete procedure for this topic.

1. Select **Unlock Printer** from the front panel, then exit the **Utilities** menu.



2. Go to **Settings**. From the Maintenance menu, select **Part troubleshooting** > **Print-quality diagnostic**.



3. Print the Diagnostic Page and use it as a reference.

4. Inspection should be done on diagnostic areas A & D primarily. If needed, recovery routines are available in the same Part troubleshooting menu. Please follow the Printhead Troubleshooting Guide instructions, available in HP 3D Center by PrintOS Knowledge zone.

NOTE: After long periods of idle time, the material system may take 1 ~ 3 hours to return to a properly humidified condition.

5 Printer networking

Introduction

The printer provides a single RJ-45 port for a network connection. For optimal performance, HP recommends using Cat 5/5e or Cat 6 cabling and gigabit-capable local network equipment.

A correct network setup is required to operate the printer, as all communication with printing and management software goes through the network.

IMPORTANT: In order to print, the printer must be connected to the Command Center, and the Command Center must be connected to the cloud.

Connectivity requirement and remote monitoring

The customer will allow HP to install the HP Command Center software (or other applicable HP software that controls the HP product and enables remote monitoring) on the customer's computer.

The customer will keep that computer connected to the HP product, and the customer will keep the HP Command Center software running on that computer and connected to the HP product at all times.

The customer will provide, at the customer's sole expense, permanent HP Command Center software connectivity to the HP secure cloud via permanent Internet connection through an HP-approved communications channel and ensure such connectivity at all times as further specified in the site preparation guide. The customer is responsible for restoring connectivity in a timely manner in the event of interruptions.

THE CUSTOMER AGREES THAT FAILURE TO MAINTAIN THE PRODUCT'S CONNECTION TO THE HP CLOUD AS SPECIFIED IN THE SITE PREPARATION GUIDE WILL RESULT IN LIMITED OR NO PRODUCT FUNCTIONALITY AND LIMITED SERVICE LEVEL.

HP products may collect the customer machine data. The customer grants HP and/or an HP authorized agent permission to access remotely, via the HP Command Center software, the customer machine data from HP products.

The customer machine data will be used by HP and/or an HP authorized agent for the purpose of providing remote support, enabling enhanced diagnostics, preventive maintenance, software updating, calculating supplies and consumables usage and statistics, and evaluating improvements to HP's products and offerings in the future. In addition, the customer machine data will help HP to determine how HP products are being used, which product features are used the most, and to calculate various aggregate HP product usage statistics.

HP and/or HP authorized agents respect your privacy, are committed to protecting your machine data, and will take reasonable precautions to prevent unauthorized access or disclosure and ensure the appropriate use of your machine data. In the event that some data may be categorized as individual level data, HP and/or an HP authorized agents will maintain the privacy of any such data, as well as all data collected, in accordance with the HP Privacy Statement (http://www.hp.com/go/privacy) and the Personal Data Rights Notice (http://welcome.hp.com/country/privacy/privacynotice) where applicable.

"Customer machine data" means data from the customer's HP product that may include but is not limited to the following: HP product usage data; HP product production data; HP product system events; HP product

maintenance and calibration history; HP product model number; HP product serial number; HP product firmware version; HP product IP address; consumable status and history; sensor activity; quantity and type of printheads used; build ID; build duration; and/or print mode. Customer machine data does not include: design files, parts files, job names, job contents, part geometries, thermal maps, user names, or part names.

Configuration

To access the network settings, tap and then on the front panel.

Hostname

You can assign a customized hostname to the printer. If the network infrastructure supports it, the printer will attempt to register the hostname to the DNS service, making it possible to address the printer using the hostname rather than the IP address.

Similarly, you can assign the domain suffix, to define the printer's fully qualified domain name.

IPv4 configuration

You can select whether the printer should try to discover automatically the IPv4 network settings using the DHCP protocol, or whether you want to configure them manually. These settings include:

- **IP address**: The unique Internet Protocol address assigned to the printer.
- **Subnet mask**: The mask corresponding to the printer's IP address.
- **Default gateway**: The IP address of the network gateway.
- **DNS configuration method**: Whether DNS servers should be assigned by DHCP service or manually.
- **Primary and secondary DNS servers**: The IP addresses of the DNS servers.

Link speed

The embedded network controller supports connection to IEEE 802.3 10Base-T Ethernet, IEEE 802.3u 100Base-TX Fast Ethernet, and 802.3ab 1000Base-T Gigabit Ethernet compliant networks. When connected and powered on, the printer auto-negotiates with your network to operate with a link speed of 10, 100, or 1000 Mbps, and to communicate using full- or half-duplex mode. However, you can manually configure the link using the printer's front panel, or through other configuration tools once network communication is established.

6 Design and printing guidelines

Introduction

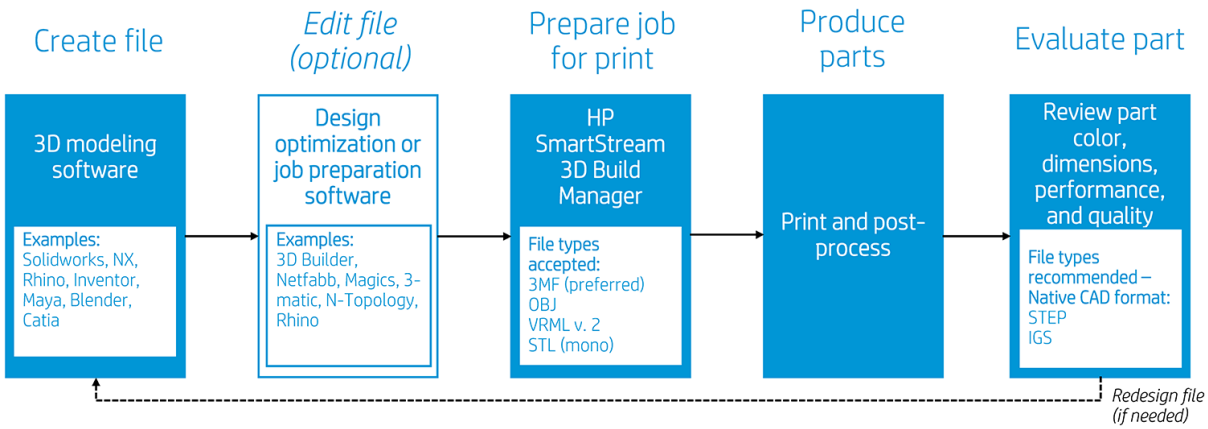
3D printing offers a much higher level of freedom in terms of design than any other traditional manufacturing technology. Designers and engineers can benefit from this, and use new geometries and concepts that were not feasible before. However, in order to optimize the design to be printed with MJF, you should be aware of some characteristics of the printing process and its capabilities, as this could help to get the best of the technology.

The design and printing guidelines offer an overview of the steps to follow before sending a job to print, from file preparation to the considerations that should be taken into account in the design of the parts and the orientation of them in the build chamber to optimize the final part quality and printing performance.

File preparation

File usage in the end-to-end workflow

In the end-to-end workflow of the printing process, the files pass through different software applications. For example, the first design may be done in a CAD program, while the job preparation will be handled in HP SmartStream 3D Build Manager. If required, the printed part can be scanned in 3D and compared with the original design.



Minimum specification for parts

When designing parts in your 3D modeling software, HP recommends keeping this minimum specification in mind to avoid issues with parts and to achieve the best quality.

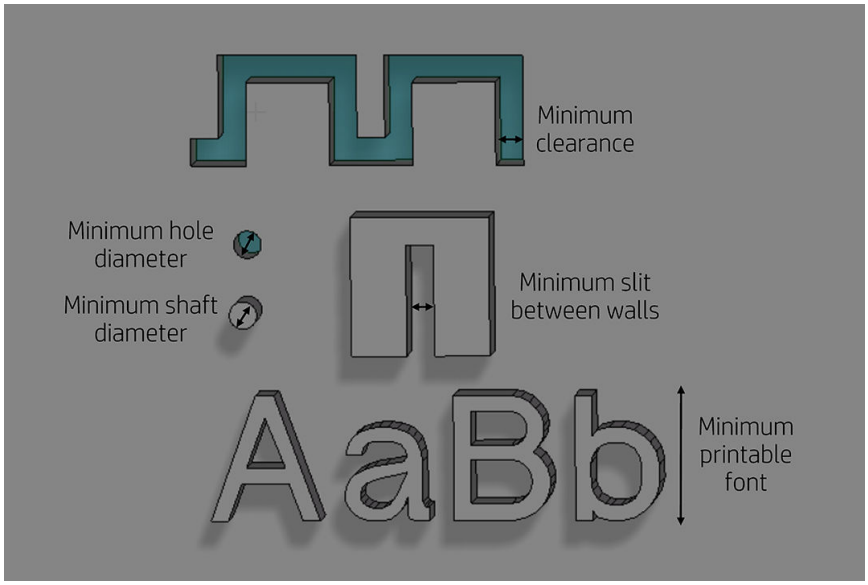
The minimum printable features in planes X, Y, and Z are as follows:

Table 6-1 Minumum printable

Specifications	Descriptions
Minimum hole diameter at 1 mm thickness	0.5 mm (0.02 in)

Table 6-1 Minumum printable (continued)

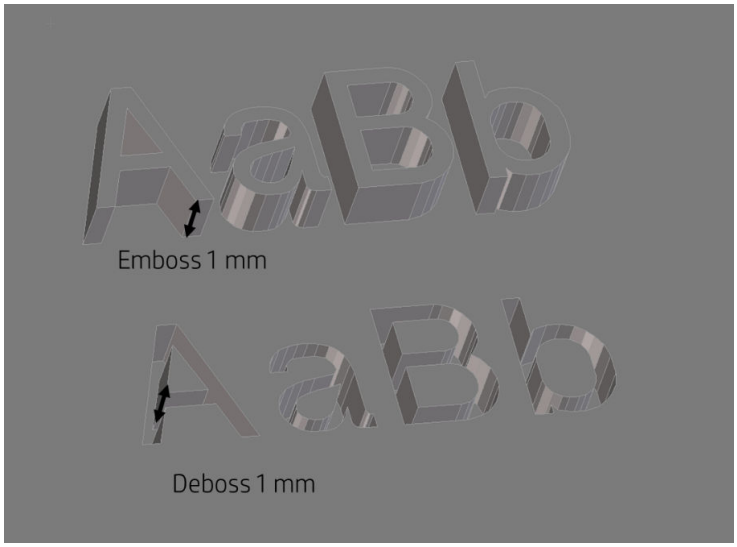
Specifications	Descriptions
Minimum shaft diameter at 10 mm height (white parts)	0.5 mm (0.02 in)
Minimum shaft diameter at 10 mm height (color parts)	1 mm (0.04 in)
Minimum printable font size for embossed or debossed letters or numbers	6 pt (2.1 mm) (0.083 in)
Minimum clearance at 1 mm thickness	0.5 mm (0.02 in)
Minimum slit between walls	0.5 mm (0.02 in)



- **Engraving.** Multi Jet Fusion technology allows you to print letters and drawings with a very high resolution and definition.

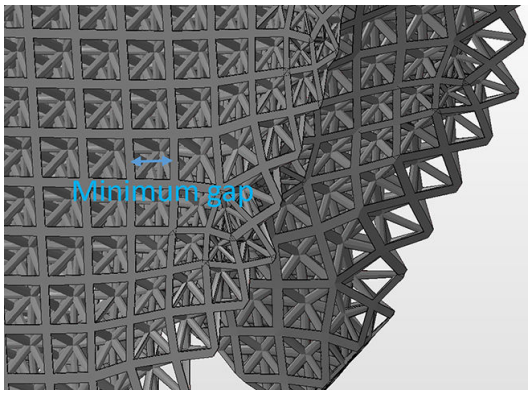
  For the best possible output, any text, number, or drawing included in a part of the same color should have at least 1 mm of depth or height. When using contrasting colors, there is no minimum.

  The best orientation for embossing and debossing letters is to place them upside down in the build chamber.

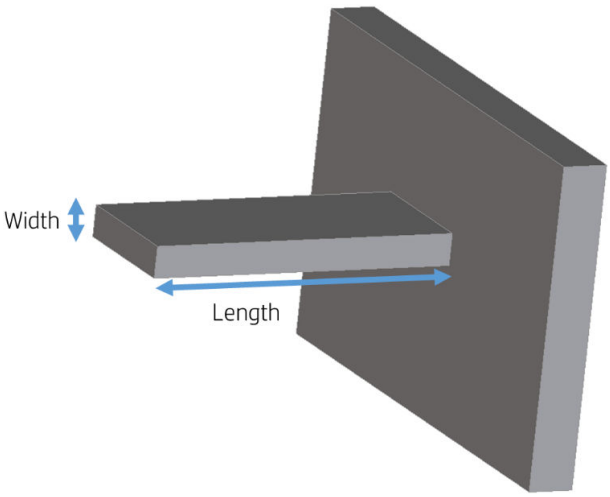


- **Solid part or structural fill.** Multi Jet Fusion allows you to print topology-optimized, generative designs or even small lattice structures. This kind of design helps to reduce the weight of the part and the quantity of material used, which not only reduces the cost of the part but also helps to reduce the operating cost in applications that are very weight-sensitive.

  The minimum gap recommended in a lattice structure to ensure that all the material inside the part can be removed is 5 mm.



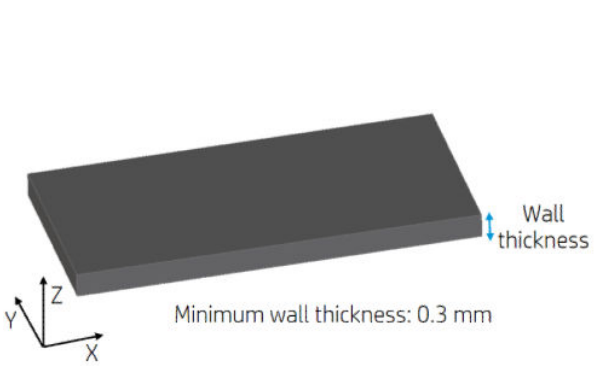
- When printing a **cantilever**, the minimum wall thickness depends on the aspect ratio, which is the length divided by the width.

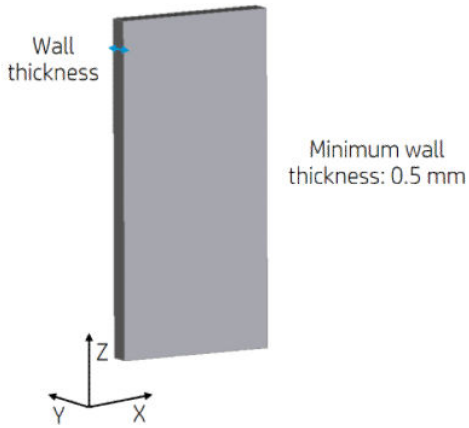


Aspect ratio = Length/Width

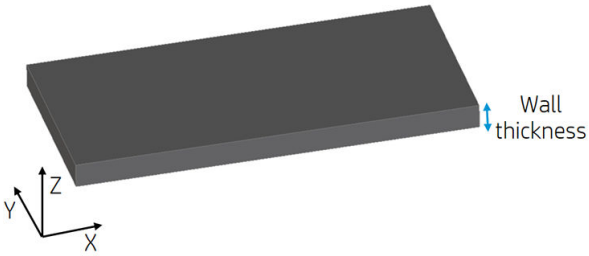
For a cantilever with a width less than 1 mm, the aspect ratio should be less than 1. For widths greater than 1 mm, parts with a high aspect ratio have a higher risk of warping (10:1 or greater).

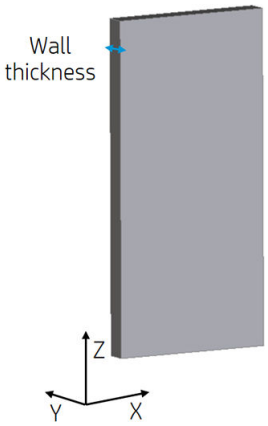
- For white parts, in general, the minimum recommended **wall thickness** is 0.3 mm for short walls oriented in the XY plane, and 0.5 mm for short walls oriented in the Z plane.





For color parts, in general, the minimum recommended **wall thickness** is 0.5 mm for short walls oriented in the XY plane, and 1 mm for short walls oriented in the Z plane.





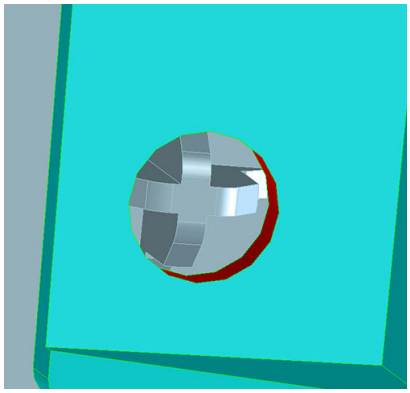
For parts with a high aspect ratio (>10:1), HP recommends increasing the wall thickness, or adding ribs or fillets to reinforce the part.

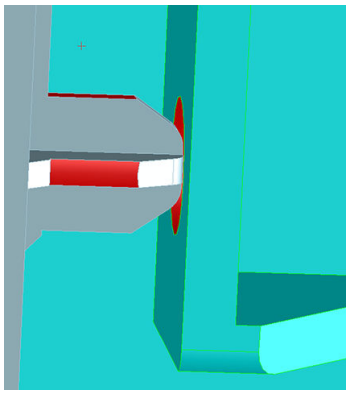
Very thick walls can accumulate heat and cause spot shrinkage in dense areas with an accumulation of material.

For best results, ribs should be no thicker than their base wall.

TIP: Hollow out the part as much as possible, saving agent and material, and reducing sink marks.

- **Minimum gap** between parts to be assembled after printing. Sometimes a pair of printed parts need to fit together for the final application. In these cases, HP recommends gaps of at least 0.5 mm between the interface areas that should fit together, in order to ensure correct assembly.

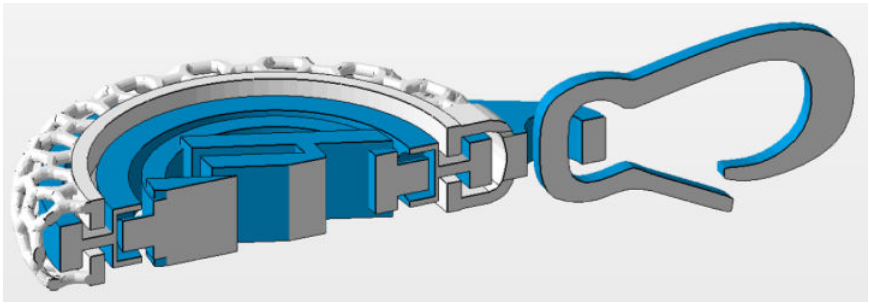


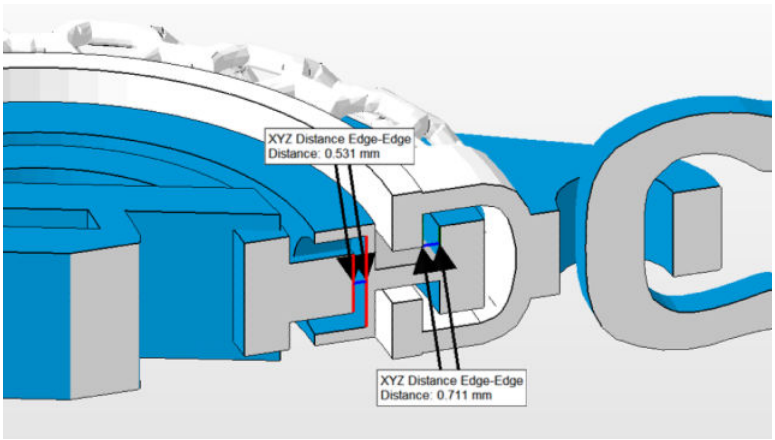


- **Minimum spacing and clearance** between parts printed as assemblies. Assembly parts that are printed together should have a minimum clearance of 0.7 mm. Parts with thick walls or large surface areas where the assembled features will fit together should have a larger gap to ensure sufficient material escape paths.

  Consider this example using the HP Keychain part:

Here is a cross-section of said part:



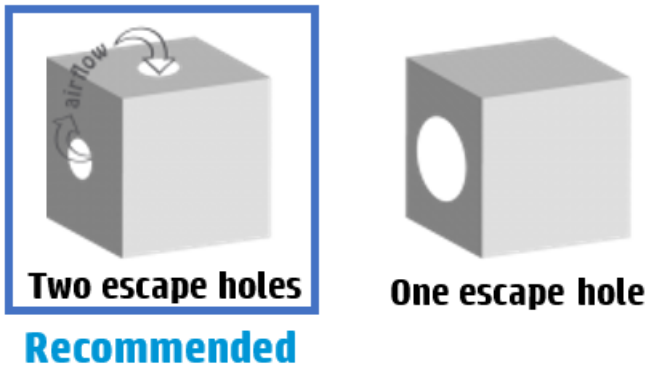


– The inner circle with the HP logo will rotate freely after bead blasting although the clearance is quite low (less than 0.7 mm). This is because there is a small surface area of “contact” between the two surfaces that must freely move and an easy escape path for the unfused material to be removed during bead blasting.

- The outer circle contained in the white mesh cage typically requires more time bead blasting to remove all unfused material and more time “working” the rotating action by hand to work free any unfused material. Although there is at least 0.7 mm of clearance between the adjacent surfaces of the outer circle, the features that must rotate freely have a large amount of surface area, and there is no easy path for the unfused material between the two surfaces to escape during bead blasting. The large surface areas of fused material around the clearance also traps heat and could cause the material in the clearance area to fuse. This example highlights how, in order to design a successful assembly with components that move freely, there must be a clear escape path for the unfused material if small clearance sizes are required.
- Large surface area between faces with 0.711 mm clearance:

- Small surface area between faces with 0.531 mm clearance:

- **Hollow closed geometries.** Multi Jet Fusion is a process in which the parts are built by selectively fusing the desired areas of a material-based layer. If the parts printed are hollow, the unfused material can either be trapped inside the fused walls of the part or drain holes need to be added to the design to remove the material. The minimum recommended diameter of the holes is 5 mm; preferably larger, for ease of cleaning. HP recommends including at least two holes.

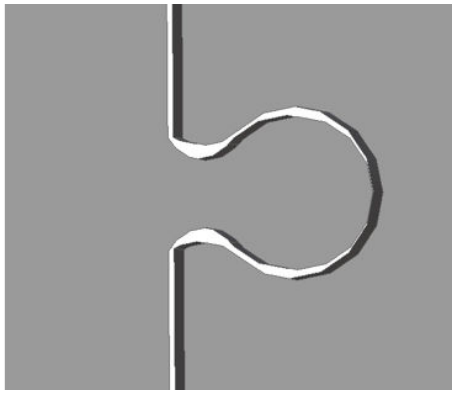


- Minimum recommended diameter of drain holes: 5 mm.
- Minimum recommended wall thickness: 2 mm.
- This method offers maximum part weight reduction.

- Unfused material will remain inside the part.
- Minimum recommended wall thickness is 2 mm.
- There is still a noticeable weight reduction compared to a solid part.

- **Glue lines.** Parts larger than the maximum build size can be printed with Multi Jet Fusion by splitting them into different parts. They can then be joined together by glueing, welding, or by pin inserts.

  If you plan to glue parts together, HP recommends including interlocking features such as those shown in the pictures below: as a guide to position the parts, to help them to bond together, and to facilitate the glueing process. Remember to leave an additional space of 0.2 mm between parts for the glue, in addition to the minimum spacing between parts printed as assemblies (see above).



- **Ducts.** To remove material from narrow ducts, consider designing and printing a strip or a chain through the duct. When the parts have been printed, you can pull out the chain to dislodge most of the material. Any remaining material can be removed by the normal cleaning process.

Coloring parts

After creating your 3D model, it is recommended to color your model before bringing it into the HP SmartStream 3D Build Manager since coloring options are limited there. There are two primary ways of adding color to 3D models:

- **Color addition by part, face, or shell:** Commonly seen in CAD programs, this allows you to color specific areas of a part.

Figure 6-1 A model with the entire part colored

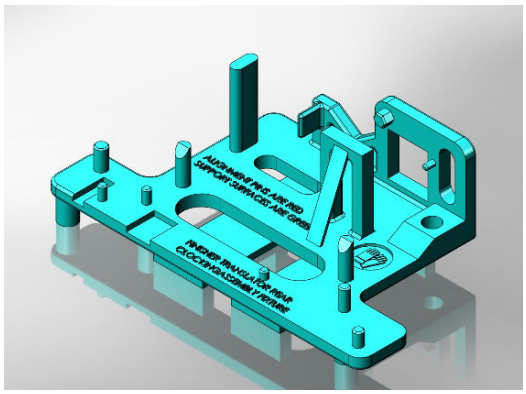
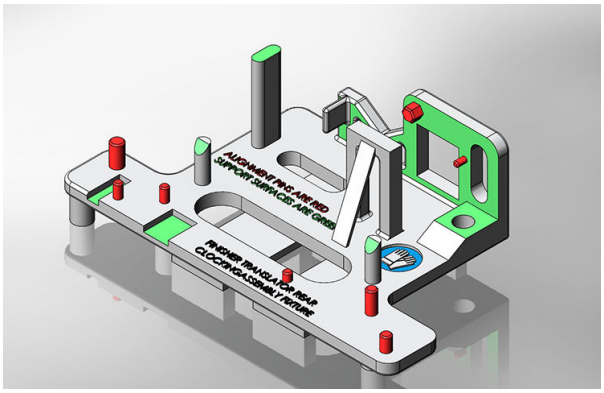
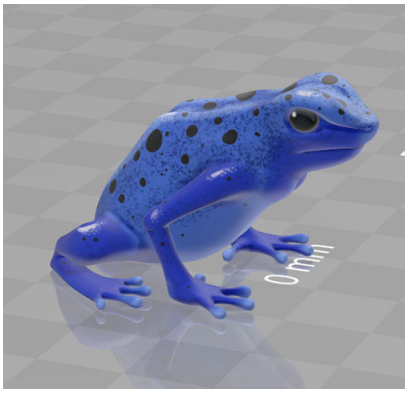


Figure 6-2 A model with the different colors on different faces



- **Texture mapping:** Commonly seen in graphic art programs, texture mapping takes an image and wraps it around a 3D object.

Figure 6-3 A model with a texture map



See your CAD or graphic arts software guidelines for how to use these features. You can also color previously uncolored models in a free program, such as Microsoft 3D Builder, which is free on all Windows systems. 3D Builder has easy-to-use color and texture map additions for beginners.

Saving and exporting files

After your files are designed and colored, your model needs to be tessellated, or converted into triangles, which are used by the printer to create layers. Tessellation occurs when you save or export your model file into specific file formats. The HP SmartStream 3D Build Manager accepts four different file formats:

- 3MF

NOTE: 3MF is the preferred file format for HP SmartStream 3D Build Manager.

However, defer to the recommended file export format chart below for color models.

- VRML 2 (.wrl)
- OBJ
- STL

NOTE: STL files do not carry color information. Use 3MF, VRML 2, or OBJ file formats for color models.

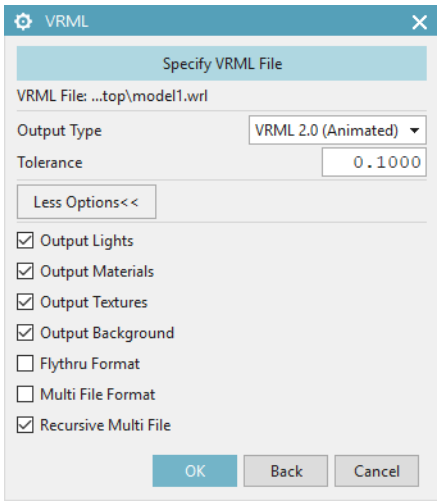
When saving or exporting your file, note that a normal file size for a model is about 1–200 MB, but the size depends on the type of software that created it, the number of triangles, the number and level of details, and so on. HP does not recommend working with files of more than 4 GB—beyond that size, the extra resolution in the file may have no effect on the printed part.

When exporting to STL, OBJ, or VRML 2 from a CAD package, you are often required to introduce some parameters such as angle tolerance and deviation chord height. These parameters define the resolution and file size of the part. The recommended parameters when exporting parts are an angle tolerance in the range 1–5 and a deviation chord height in the range 0.05–0.2. The angle tolerance should be reduced for parts with cylindrical or spherical shapes, and the chord height should be minimized for parts with fine details and small features.

Below, you will find some recommended export parameters/settings for common 3D modeling programs.

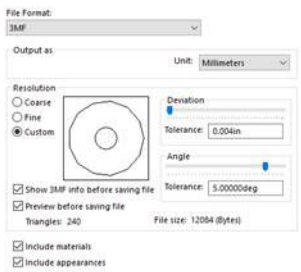
Siemens NX recommended export settings

Recommended export format: VRML (.wrl)



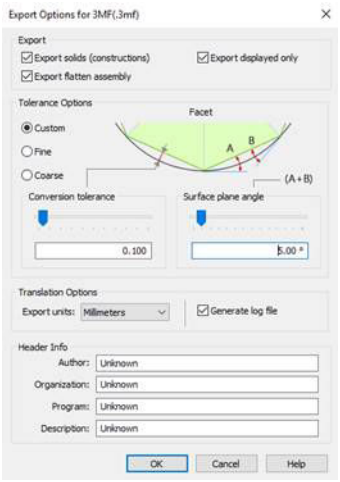
SolidWorks recommended export settings

Recommended export format: 3MF (.3mf)



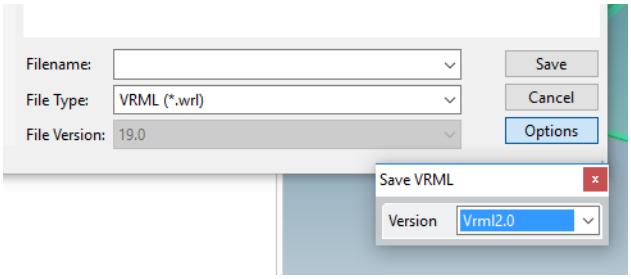
Solid Edge recommended export settings

Recommended export format: 3MF (.3mf)



Creo Elements recommended export settings

Recommended export format: VRML (.wrl)



Recommended file export formats for color models

In addition to having the correct export settings, HP recommends saving your color models in specific file formats, depending on which 3D modeling software program you use. Note that not all programs can export texture maps, even though texture mapping features may be available in the software. If this is the case, it is recommended to bring your uncolored model into a software that can export texture maps, and then add the texture map in that software. There are free software options, such as Microsoft 3D Builder and Blender, that allow you to do this.

Table 6-2 Recommended file export

Software	Recommended file export format	Can export texture?
3D Builder (16.1.651.0)	3MF	Yes
Adobe Photoshop (19.1.4)	VRML or OBJ	Yes
Autodesk 3ds Max (2019)	VRML	Yes
Autodesk Fusion 360 (2019)	STEP	No
Autodesk Inventor (2019)	OBJ	No
Autodesk Maya (2019)	OBJ	Yes

Table 6-2 Recommended file export (continued)

Software	Recommended file export format	Can export texture?
Autodesk Netfabb (2019.2)	3MF	Yes
Blender (2.79)	OBJ	Yes
Dassault CATIA (5)	VRML	Yes
Dassault SOLIDWORKS (2019)	3MF	Yes
Materialise Magics (21.0)	3MF	Yes
PTC Creo Elements (19)	VRML	No
PTC Creo Parametric (3.0)	OBJ	No
Rhino (6)	VRML	Yes
Siemens NX (12.0)	VRML	No
Siemens Solid Edge (ST10)	3MF	No

NOTE: If you are saving your color models in the recommended format and are still experiencing issues correctly opening your color models in HP SmartStream 3D Build Manager, see the printing tips and tricks document.

Tesselation problems

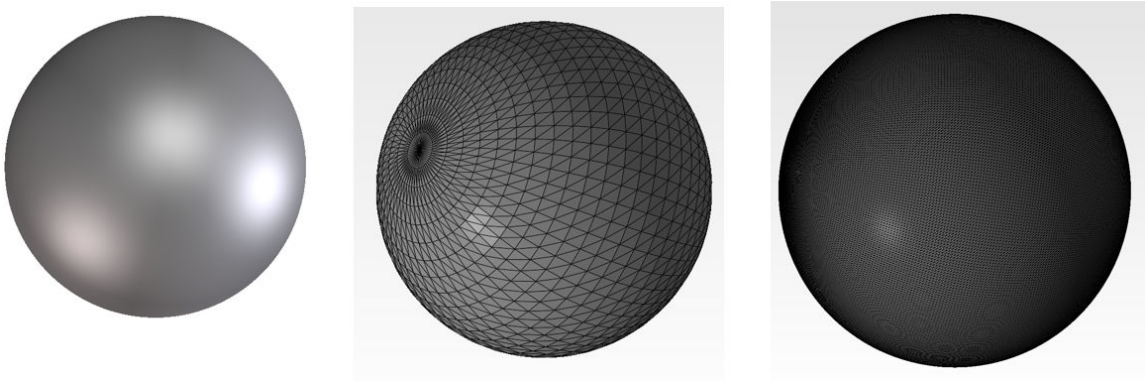
These are some common problems that you could experience during tessellation/exporting your files:

- Too many or too few triangles

  Too many triangles are difficult to process and, when a certain size is reached, the extra triangles do not provide any further accuracy. For this reason, an excess of triangles could increase processing time for no benefit.

  Triangulation of a surface causes faceting of the 3D model. The parameters used to output an STL model affect how much faceting occurs.

  Figure 6-4 Example of tessellation

- Holes in triangles

  STL models commonly suffer from surfaces that are not joined to their neighbors, and missing surfaces.

Repairing files

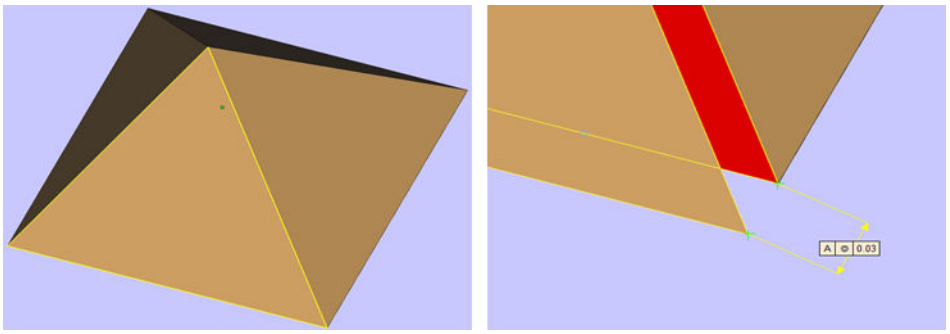
File-repairing software

- Magics – Materialise
- Autodesk Netfabb
- HP SmartStream 3D Build Manager

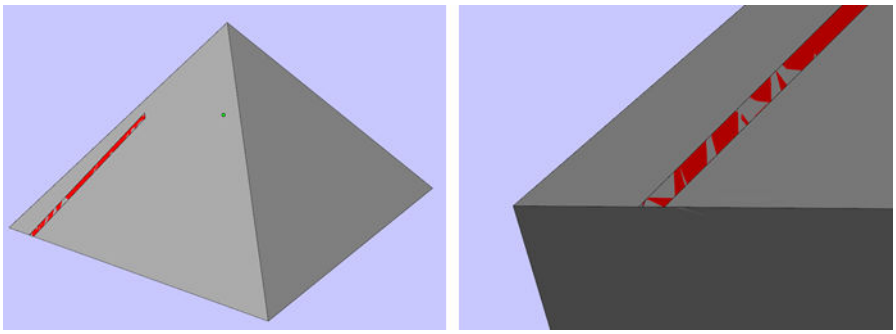
Common errors

Some common errors that cause part-quality-related issues are illustrated below. They can be fixed in the native CAD software; or, if that is not available, in Magics, Netfabb, or HP Smartstream 3D Build Manager. If these files are not fixed before attempting to build the design, either the software will not allow you to proceed due to poor file quality, or your part will not have good quality. Therefore, it is prudent to spend time at this stage to check that the CAD file designer produced a high-quality and printable design.

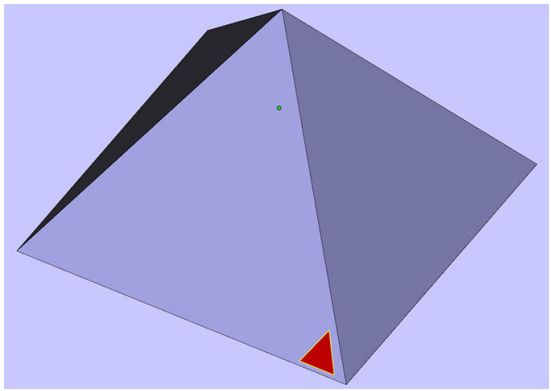
- Triangles not joined



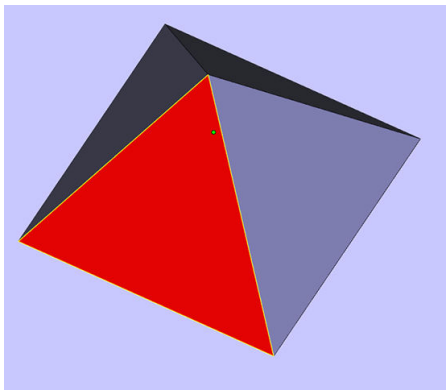
- Overlapping triangles



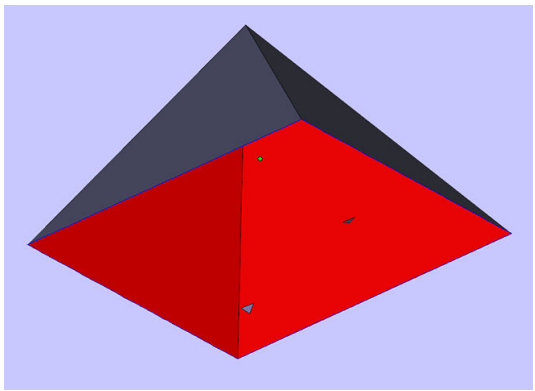
- Holes in parts



- Flipped-direction triangles



- Tiny shells



HP SmartStream 3D Build Manager

The HP SmartStream 3D Build Manager must be used to send jobs to print. Therefore, after files are exported, either from your CAD, graphic arts, or separate 3D build manager software, they must be brought into SmartStream 3D Build Manager.

NOTE: For optimal dimensional accuracy, export parts separately instead of grouping them within one file.

In HP SmartStream 3D Build Manager, you will be able to access some color editing features, including:

- The ability to color an entire part with one color of your choosing
- The ability to edit the hue, lightness, and saturation of existing colors
- The ability to display a print preview of the color part to be printed
- The ability to print a color set model to test colors

See the *HP SmartStream 3D Build Manager User Guide* (http://www.hp.com/go/SmartStream3DBuildManager/manuals) for full descriptions of these features, or view this video: https://www.youtube.com/watch?v=3IfrpLMrJ4U&t=14s.

The software preparation process may take from 15 minutes to 2 hours depending on the complexity of the job. It can be done while printing other jobs. Once ready, you can select the job to be printed from the job queue on the printer's front panel. If an error occurs while processing, a message appears on the front panel, and the printer cancels the job. To retry, you have to resubmit the job.

7 Prepare a job

Introduction

Achieving a successful build with good part quality depends on how the build chamber of parts is prepared. Part spacing and orientation are critical, and printing settings like the print profile, fresh material mix ratio, and cooling profile can influence the 3D workflow and printed part quality. This chapter provides basic information on how to prepare a build. For more information on techniques to achieve good part quality, see the Part Quality Tips & Tricks document in 3D Center Knowledge Zone.

Build packing basic guidelines

Below are some basic guidelines that HP recommends when packing parts in a build to print. This can be considered a good starting point, but more information on job packing best practices to optimize part quality aspects can be found in the Tips & Tricks document.

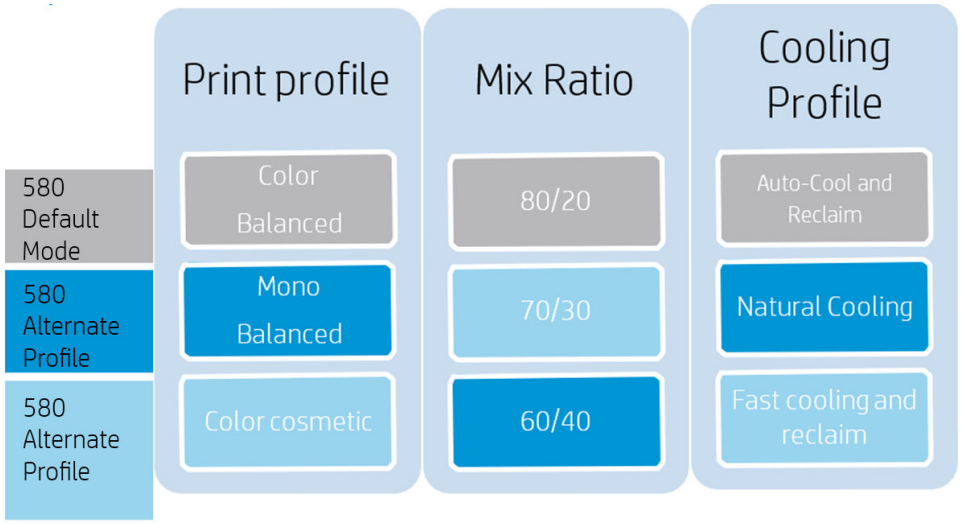
https://www.printos.com/knowledge-zone/#/view/asset/45397

- 5 mm spacing between small parts
- 15 mm spacing between large or dense parts
- Hollowing dense parts is a good option to optimize look and feel
- Rotate parts to avoid angles of more than 20 degree to the XY plane: low angles can result in visible stair-stepping
- Rotate parts to avoid flat walls on the horizontal or vertical planes, especially near the build chamber walls
- Rotating parts 30 degrees over 2 axes is a good general rule

Job settings selection

There are several print modes, material mix ratios and cooling profiles available to choose from. These options are selected in the software program before sending the job to the printer.

580 printers



Note that once a setting is selected it becomes the default and must be unselected for the subsequent job.

Print mode comparison

Why would you use the Color Balanced print mode?

- If the job has both color and mono parts
- Yields higher part strength than the Color Cosmetic mode
- If color is used for showing information, labeling, or keying, where cosmetics is not the most important criteria
- If the part is susceptible to elephant skin in Color Cosmetic mode

Why would you use the Color Cosmetic print mode?

- It yields the most vivid colors
- It offers the most color consistency
- It is the lowest temperature print mode
- If color quality and color uniformity are the most important criteria for your part
- If the part is susceptible to thermal bleeding in Color Balanced mode

Why would you use the Mono Balanced print mode?

- Yields higher part strength and dimensional accuracy relative to both Color print modes
- It is the highest temperature print mode
- If part strength and repeatable functionality are the most important criteria for your part
- If part color does not apply

Why would you use the MonoCosmetic print mode?

- If part color does not apply
- It is the lowest temperature print mode

- If the part is susceptible to thermal bleeding in Mono not colored Balanced mode
- If labels, small details, and fine features are important

Fresh material ratio comparison

Why would you use a 20% ratio?

- It offers the lowest overall part cost

Why would you use a 30% ratio?

- It optimizes material usage by increasing packing density and build size
- A full-build chamber job with 20% fresh material cannot exceed a certain packing density

Why would you use a 40% ratio?

- It optimizes material usage by increasing packing density and build size
- It generates more reusable material
- It improves part strength
- It reduces side holes/porous parts

Cooling profile comparison

Why would you use Auto cool & reclaim?

- Optimizes part stability and predictable outcomes
- Parts are more likely to warp with this profile than with the Natural cooling profile

Why would you use Natural cooling?

- Allows for parts to be cooled as long as desired
- Parts can be extracted manually at minimum contact temperatures
- Provides a long annealing time, which minimizes warpage
- Helps you to avoid damaging delicate features during extraction
- For tracking unlabeled parts

Why would you use Fast cool & reclaim?

- Reducing “time to parts” is the most important criteria (up to 6 hours faster for a full build chamber)
- For more information on Fast cooling mode, see the MJF 340-540-580 Fast Cooling whitepaper

8 Send a job

Use appropriate software to send the job to the printer, such as the HP SmartStream 3D Build Manager (see the *HP SmartStream 3D Build Manager User Guide*).

Other software programs that have the capability to send a job to the printer include Autodesk Netfabb and Materialise Magics.

9 Select a job

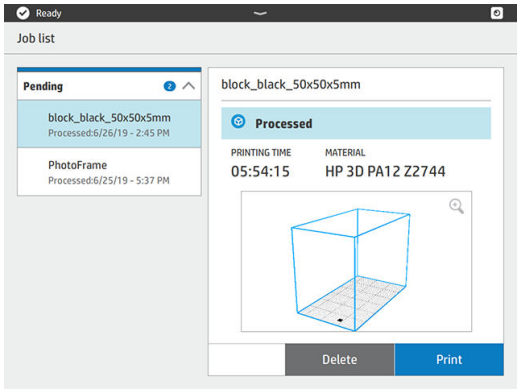
Job list app

The job list app in the printer's front panel displays the status of all jobs. Possible statuses are:

- **Waiting to process**: The job has been received by the printer and is queued for processing.
- **Processing**: The job is being analyzed by the printer.
- **Processed**: The job is ready to be sent for printing. Either it has never been printed, or it is ready for reprinting.
- **Ready to print**: The job is ready to be printed. When this job is selected, the **Print** button is available.
- **Sent to print**: The job has started printing.

Select a job to be printed

1. Tap **Jobs** on the home screen.



2. Select the processed job and tap **Print**.
3. The printer checks that all subsystems and supplies are ready to complete the build (see Job preparation list on page 48). If your attention is needed, the printer notifies and advises you: a list appears with all of the required and recommended tasks to ready your printer. To print the job, address any issues on the list by following the front-panel instructions. Once you have completed all the tasks on the list, the printer will run a second check to ensure it is ready to print the job. If there are any additional issues, the front panel will again provide instructions.
4. The printer starts the printing process. Wait until the printer tells you that the process is complete.

10 Printer preparation

Job preparation list

Before printing, the printer performs some checks to ensure that it is ready to print the whole build. These include the following checks:

- Printer clean (see Clean the print area on page 114)
- Job compatible with device
- Printhead ready (see Align the printheads on page 167)
- Cloud connected (see Printer networking on page 25)
- Enough agent (see Agents on page 48)
- Enough material (see Material on page 51)
- Enough water in the distilled water tank (see Distilled or deionized water on page 55)
- Printhead cleaning roll ready (see Replace the cleaning roll on page 141)
- Filters ready (see Maintenance on page 105)
- Lamp clean
- Doors closed

If the printer finds any problem, it may ask you to contact your support representative for assistance.

Agents

The printer uses seven types of agents: black, detailing, fusing, yellow, magenta, cyan, and bright fusing agents.

Please note:

- This is a dynamic security-enabled printer. Cartridges using a non-HP chip will not work. For more information, see http://www.hp.com/go/learnaboutsupplies.
- This printer is not designed to use continuous agent systems. To print successfully, remove any continuous agent system and install genuine HP cartridges.
- This printer is designed for agent cartridges to be used until they are empty. Refilling cartridges prior to depletion could cause your printer to fail. If this happens, insert a new cartridge to continue printing.

Status

At the printer's front panel, tap , then **Agents**, then tap any agent to see its status:

- **Check pending**: The cartridge is present, but has not yet been checked. The agent door must be closed before the cartridge can be checked.
- **Checking**: The cartridge is being checked.
- **Not present**: The cartridge is not present (this is not an error status).
- **Missing cartridge**: The cartridge is not present while you are trying to perform an action or workflow that requires a cartridge, such as a build (this is an error status).
- **Out of agent**: The agent should be replaced.
- **Incompatible cartridge**: The cartridge is incompatible with the slot it was inserted into (for example, yellow cartridge in black slot).
- **Incompatible cartridge region**: Cartridges work only in specific regions of the world, for world trade and regulation reasons. This status appears if the agent and the printer are registered for different regions.
- **Reseat required**: The agent is not seated properly; try removing and reinserting it.
- **Replacement required**: The agent is faulty and should be replaced.
- **Very low agent**: The agent intermediate tank is very low and the cartridge is empty.
- **Low agent**: The agent intermediate tank is low and the cartridge is empty.
- **Expired agent**: The agent has reached its expiration date. Using expired agents may affect the warranty on your printheads.
- **Ready**: The cartridge is ready.
- **Altered cartridge**: The cartridge is unknown or altered.
- **Non-HP agent detected**: The cartridge contains non-HP agent.

NOTE: The level of each agent shown on the front panel is an estimate.

LEDs

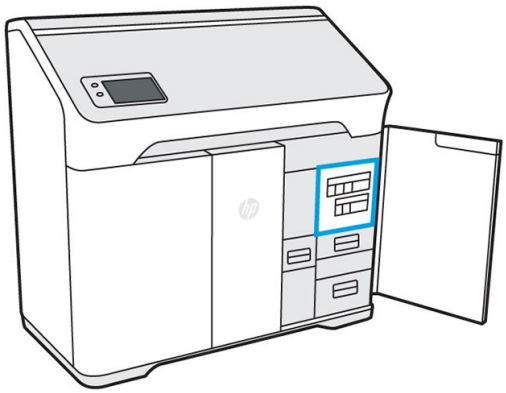
- **White:** If the light is on, the cartridge is empty and needs to be replaced.

NOTE: Printer processes may be stopped while any doors are open.

NOTE: If you remove a cartridge from the printer for any reason, try to replace it again as soon as possible. Do not open or unpackage cartridges until you are ready to install them.

1. At the printer's front panel, tap , then **Agents** > **Replace**.

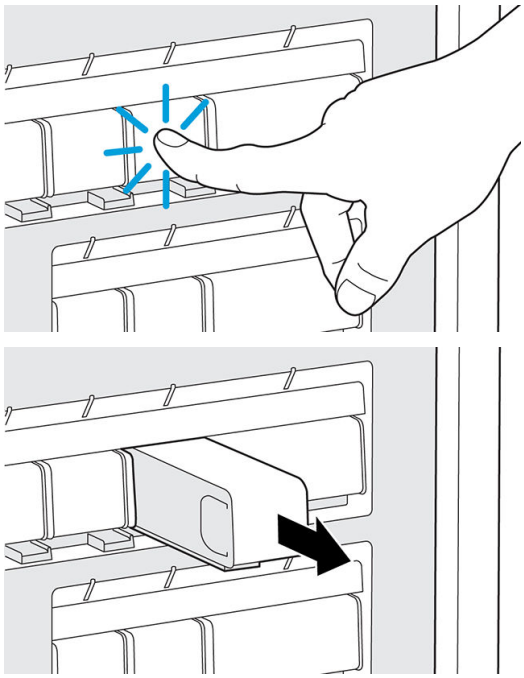
2. Open the agent door.



3. Locate the agent to be replaced. You can see which agent needs to be replaced on the front panel; it is also indicated by a white LED above the cartridge.

NOTE: More than one cartridge can be replaced at a time.

4. Press the agent to release and remove it; you should hear a click as you remove it.

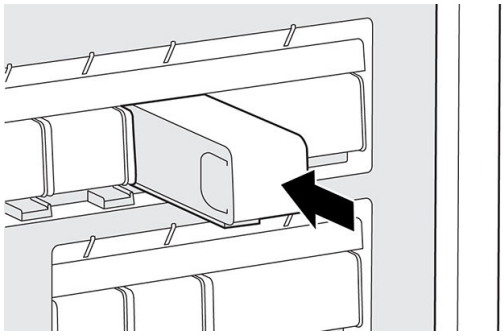


5. Old agent cartridges can be recycled through HP's Planet Partners Program, where available. Visit http://www.hp.com/recycle/ for more information. Where the program is not available, dispose of the cartridges according to local regulations.

6. Follow the instructions on the new agent cartridge to prepare it for installation.

CAUTION: Do not touch the metal contacts on the cartridge. Fingerprints on the contacts can cause connection errors.

7. Insert the new agent cartridge until you hear a click.



8. Close the agent door.
9. Tap **Finish** and **Check** on the front panel.

TIP: If the new agent fails to work, see Agent troubleshooting on page 84.

Material

The printer uses a mixture of fresh and reusable material—the configuration for PA12 material is 20% fresh, 80% reusable. The reusable material slot serves two functions:

- Adding reusable material. You may be prompted to put more reusable material into the machine if there is not enough to maintain the mix ratio and meet the requirements of the job; the front panel will walk you through installing a reusable material supply.
- Removing excess reusable material. You may be prompted to remove reusable material if there is not enough space to hold all reusable material that the job will generate; the front panel will walk you through installing an empty or partial supply to accommodate the excess material.

Material states

- **Fresh**: New, unused material.
- **Reusable**: Material that the printer has reclaimed from previous jobs, which may be reused for future jobs.
- **Waste material**: Used material that will not be reused.
- **Mix ratio**: A mixture of fresh and reclaimed material.
- **Empty**: Empty cartridges should be stored and used to reclaim material.

Mix ratio

The default mix ratio is up to 80% reusable material. However, when submitting a job through HP SmartStream 3D Build Manager, you can select your preferred mix ratio.

When a job is selected to print, the correct levels of both fresh and reusable material can be added through guided workflows on the front panel before the start of printing.

Some jobs can be printed successfully only by adjusting the mix ratio based on the printer capacity.

If the submitted job exceeds the capacity of the printer, return to the build submission software to reduce the height of the build or the packing density.

Material cartridges

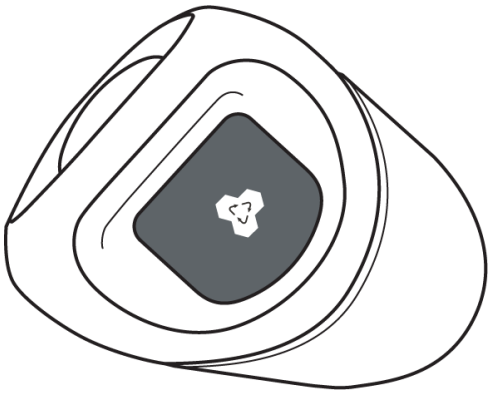
The material cartridges dispense the material in the printer. Each material cartridge has a capacity of 10 liters. The printer will not accept cartridges that have been modified or tampered with. See the material list for ordering information.

There are two material cartridge slots, one for fresh material (on the left) and the other for reusable material (on the right).

Any time you remove an empty cartridge from the fresh slot, be sure to peel off the fresh material label to reveal the reusable material label underneath. This cartridge can now be filled with reusable material and used in the reusable material slot.

Both fresh and reusable cartridges must be installed in order to print.

NOTE: Waste material that has not been automatically reclaimed should not be reintroduced into the system: it could cause print-quality issues.



You can store empty, partially full, or full reusable cartridges for later use.

Do not throw away the blue material cartridge cap. Storage for the caps is provided on the interior of the material door. Any time you remove a material cartridge from the printer, be sure to put the cap back on.

Special care must be taken to avoid personal injury when handling heavy cartridges.

Table 10-1 10 liter cartridges

Material	Total cartridge weight	Net weight of material
HP 3D HR CB PA 12 10L	5 kg (11 lb)	4 kg (8.8 lb)

Replace a material cartridge

A cartridge should be removed and replaced when indicated in the front panel, and by the wayfinding LED above or below the cartridge.

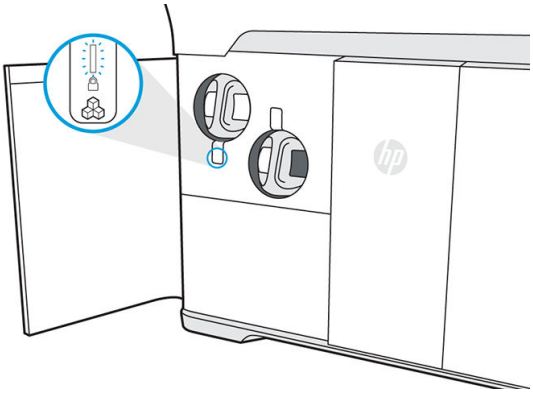
⚠ CAUTION: Cartridge removal must be initiated from the front panel. The cartridges are physically latched to the printer; do not try to pull them out without using the front panel.

⚠ CAUTION: A cartridge may be sensitive to temperature, humidity, or other factors. Using cartridges under uncontrolled conditions can affect the functionality of the printer or severely damage it.

LEDs

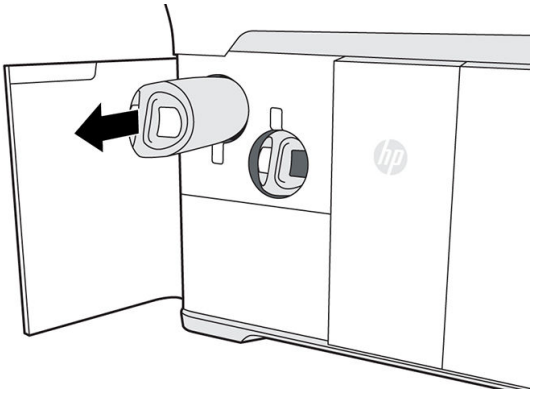
- **Wayfinding:** The wayfinding LED is in the form of a vertical line; it is located below the fresh material slot and above the reusable material slot. If the LED is on, the cartridge needs to be replaced.
- **Lock icon:** The lock icon LED is located beside the wayfinding LED for each material slot. If the LED is on, the cartridge is locked in place. To remove a cartridge, you must first unlock it, using the **Supplies** tab.

1. At the front panel, tap , then **Material** > **Fresh material** or **Reusable material** > **Replace**.
2. Open the material door. You will see a white LED in the form of a vertical line above or below the cartridge that needs to be replaced.

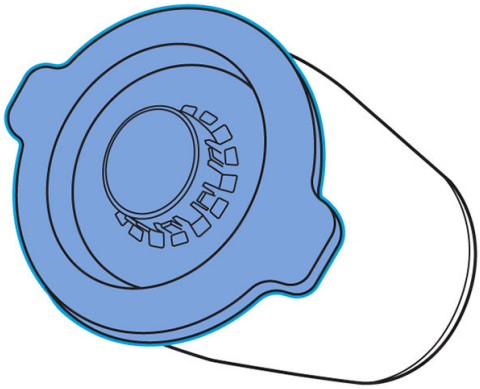


3. Pull the handle straight out to remove the cartridge from the slot.

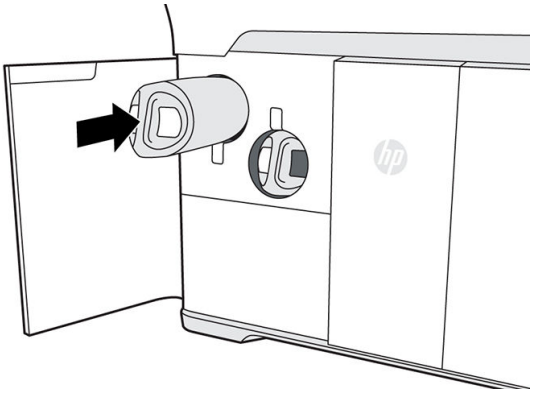
NOTE: Each cartridge weighs 1 kg (2.2 lb) empty and 5 kg (11 lb) full.



4. Reattach the cap before storing the cartridge.
5. Remove the cap from the packaging of the new cartridge.



6. If you are replacing a reusable material cartridge, wait (about 10 seconds) until the front panel tells you that the printer is ready to receive the new cartridge.
7. Insert the new cartridge into the slot until the lock icon turns on. There is no need to rotate it: just push it straight in.



8. Close the material door.
9. Tap **Finish and check** on the front panel.

Maintain the cartridges

Before use, the material must acclimatize to the environmental conditions of the room for at least two days.

During the normal lifetime of a cartridge, no specific maintenance is required. However, to maintain the highest quality, replace a cartridge when it reaches its expiration date. An alert on the front panel notifies you when any cartridge reaches its expiration date.

Store the cartridges

Cartridges should be stored according to cartridge specifications. Before use, a cartridge should be kept at the printer's environmental conditions for at least 2 days.

⚠ **CAUTION:** HP recommends storing only capped cartridges. Storing an opened cartridge containing material can render the material unusable and cause safety hazards, such as a cloud of material if dropped. Depending on the material, it can be sensitive to temperature, humidity, or other factors. Using cartridges under

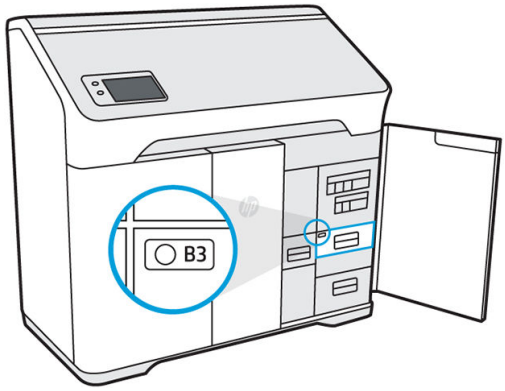
uncontrolled conditions can affect the functionality of the printer or severely damage it. Placing the cap back on the cartridge is necessary for storage to prevent material from spilling; if excess material is lost, the cartridge may not be recognized by the printer because it is considered to have been tampered with.

Distilled or deionized water

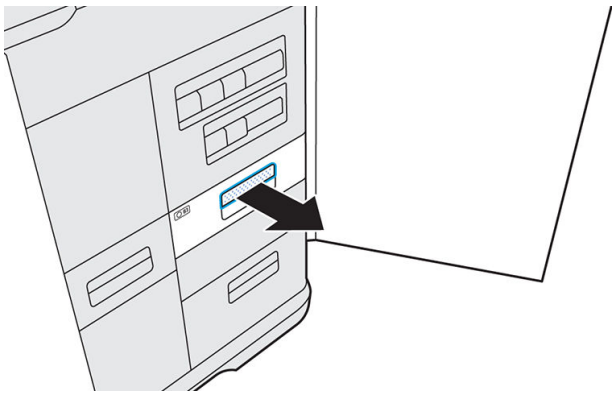
Refill the water tank when prompted by the front panel. Printing cannot start until there is sufficient water to complete the job.

⚠ **CAUTION:** Never use tap water.

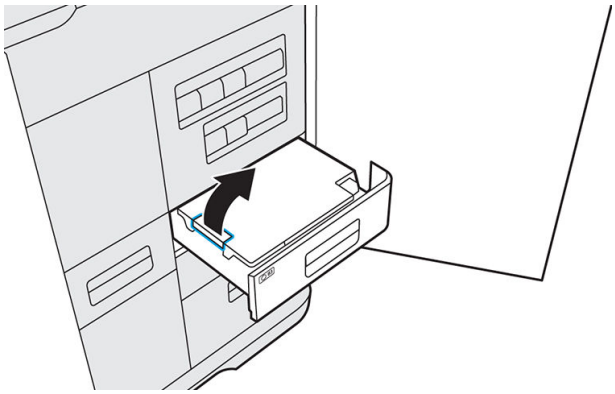
1. Open the agent door.



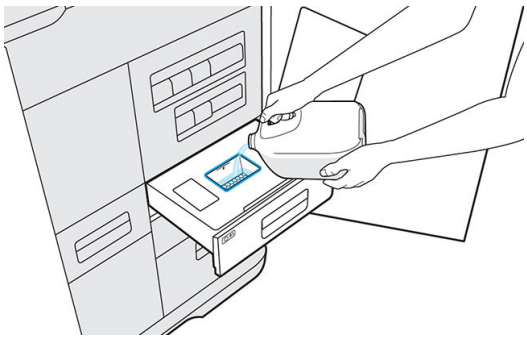
2. Open the water tank drawer.

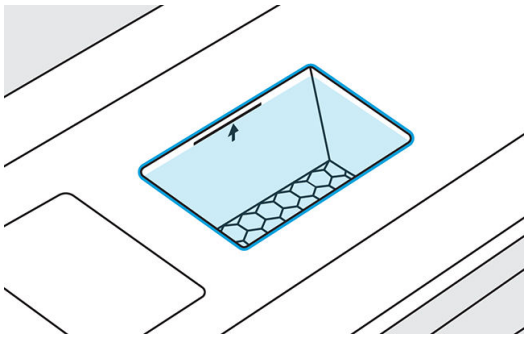


3. Open the tank cover.

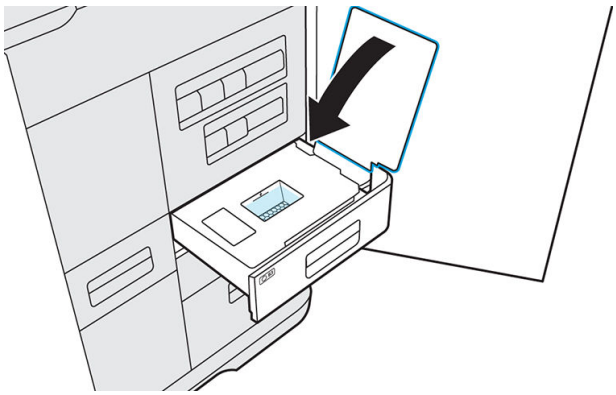


4. Add distilled or deionized water to the tank until it reaches the full line.

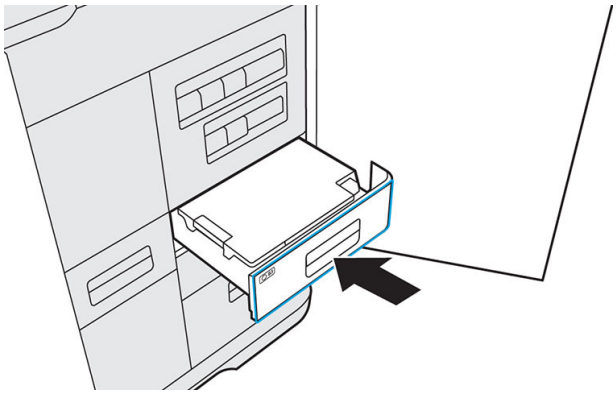




5. Wipe up any excess water or splashes with a clean cloth or towel before closing the cover.
6. Close the tank cover.



7. Close the water tank drawer.



8. Close the agent door to clear the low water message and continue printing.

Clean the caps on the capping assembly.

This is the procedure to clean the caps on the capping assembly.

Table 10-2 Warning labels

Crush hazard	Risk of trapped fingers	Hazardous moving part
For more safety information, see Safety precautions on page 4		

Tools needed

- Deionized water
- Clean lint-free cloths
- Nitrile gloves

1. Ensure that you have several clean, dry lint-free dry cloths, deionized water and nitrile gloves.

NOTE: We hardly recommend using nitrile gloves.

2. Check the printer is not printing at the moment.
3. If a job has just been printed, wait about 20 minutes further for the printer to cool down.
4. Open the top cover.
5. Open the printing carriage cover.

6. Carefully remove the printheads from the printer. Wipe the printhead cap contacts with a lint-free cloth to prevent cloth fibers contaminating the printhead cap. Dampen the cloth **only** with deionized water and move it gently up and down.

7. Let the caps dry.
8. When they are dry, replace the printheads, replace the printing carriage cover, and close the top cover.

Ribbon spreader box (340: M2K87-67009 / 540 & 580: M2K85-67040)

These are the removal and installation procedures for the Ribbon spreader box.

Table 10-3 Warning labels

Crush hazard	Risk of trapped fingers	Hazardous moving part

Table 10-3 Warning labels (continued)

Crush hazard	Risk of trapped fingers	Hazardous moving part
For more safety information, see Safety precautions on page 4		

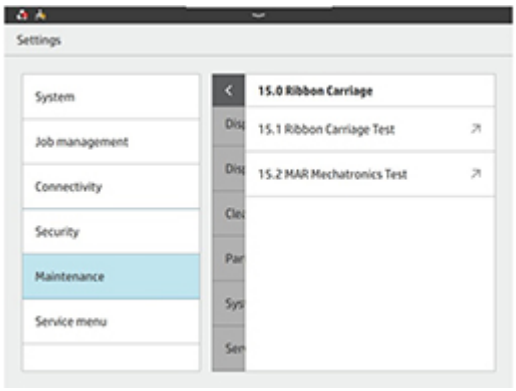
NOTE: Check if the spacer is installed inside the Ribbon Carriage Spreader box. Remove the spacer if repairing a 540 or 580 printer.

Removal

This is the procedure to remove: Ribbon spreader box

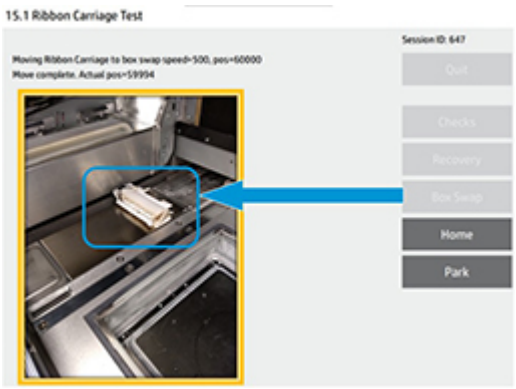
1. The printer must be ON.
2. Open the Top access door.

3. From Settings, select **Maintenance** > **Service Assist** > **15. Ribbon Carriage** > **15.1 Ribbon Carriage Test**.

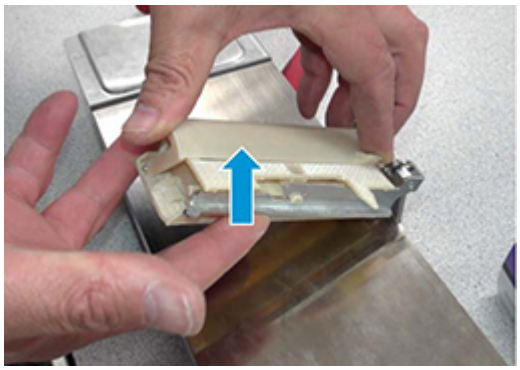


4. Select **Box Swap**.

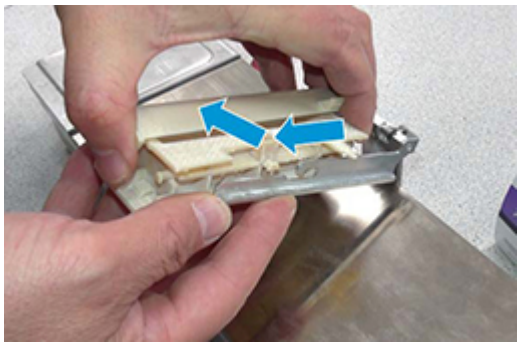
5. Wait for the ribbon carriage box to stop at the box swap position.



6. Tilt the Ribbon spreader box up by lifting the front of the Ribbon spreader box assembly.



7. Slide the Ribbon spreader box forward and up to release it from the bracket.



Installation

Reverse the removal steps to install the assembly.

NOTE: When inserting the Ribbon spreader box into the bracket be sure pins on both sides ride in their respective slots.

1. After installing the new ribbon carriage box, select **Home**. Wait for the ribbon carriage box to go back to home at the back of the printer.

2. Press **Quit** to finish.
3. Execute the routine described in Customer Self Repair additional tasks before printing on page 74.

Build platform (340: M2K87-67002 / 540 & 580: M2K85-67025)

These are the removal and installation procedures for the Build platform.

Table 10-4 **Warning labels**

Crush hazard	Risk of trapped fingers	Hazardous moving part
For more safety information, see Safety precautions on page 4		

Removal

This is the procedure to remove: Build platform

1. Remove 8x T10 screws.

2. Remove the platform.

Installation

This is the procedure to install: Build platform

▲ Check the correct orientation of the platform before installing the screws.

Printhead cap assembly (M2K85-67061)

These are the removal and installation procedures for the Printhead cap assembly.

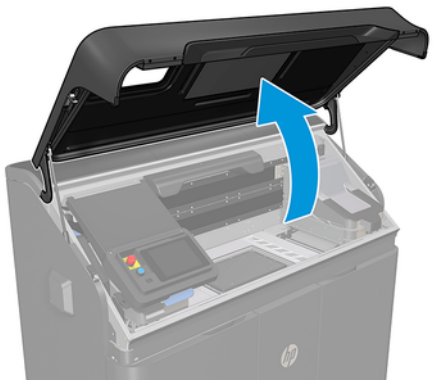
Table 10-5 Warning labels

Crush hazard	Risk of trapped fingers	Hazardous moving part
For more safety information, see Safety precautions on page 4		

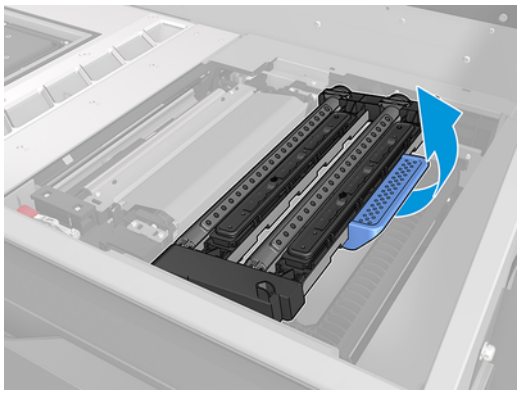
Removal

This is the procedure to remove: Printhead cap assembly

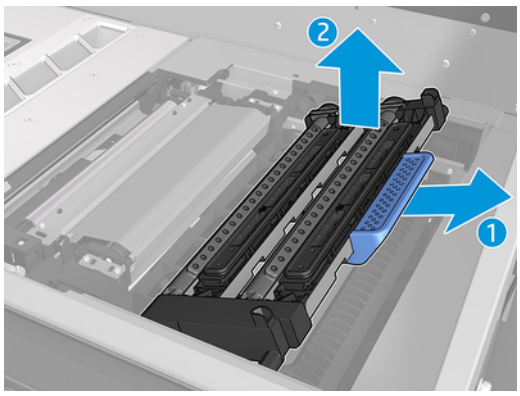
1. Open the Top access door.



2. Lift the right end of the Capping sled.



3. Slide it to the right, then lift the capping sled to remove the assembly.



Carriage front bearings (M2K85-67116)

These are the removal and installation procedures for the Carriage front bearings.

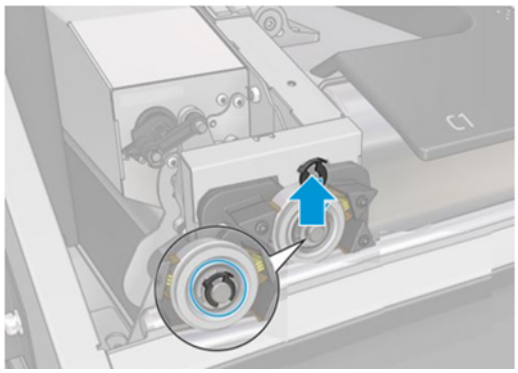
Table 10-6 Warning labels

Crush hazard	Risk of trapped fingers	Hazardous moving part
For more safety information, see Safety precautions on page 4		

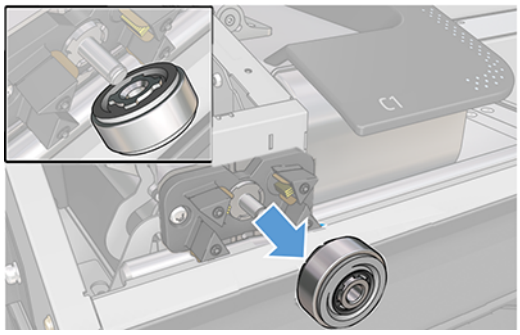
Removal instructions for the Fusing carriage

This is the procedure to remove: Fusing carriage

1. Remove the K-clip from the Fusing carriage front bearing.



2. Pull the bearing out.



Installation

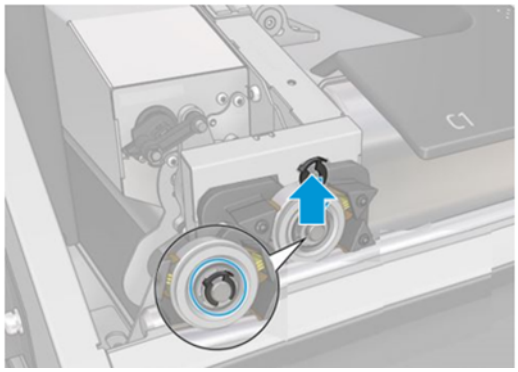
This is the procedure to install: Fusing carriage

1. Reverse the removal steps to install the front ball bearing.
2. Execute the routine described in Customer Self Repair additional tasks before printing on page 74.

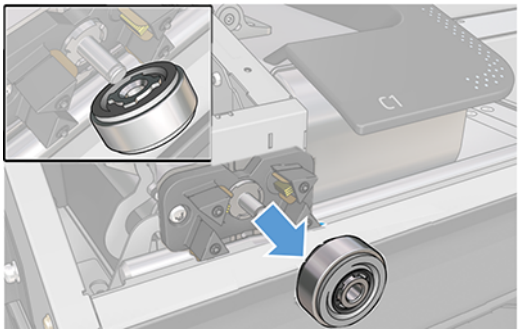
Removal instructions for the printing carriage

This is the procedure to remove: printing carriage

1. Remove the Printing Carriage carriage-cover (M2K85-67290) on page 70.
2. Remove the K-clip from the Fusing carriage front bearing.



3. Lift the carriage, then remove the bearing.



Installation

This is the procedure to install: printing carriage

1. Reverse the removal steps to install the front ball bearing.
2. Execute the routine described in Customer Self Repair additional tasks before printing on page 74.

Carriage front bearing brushes (M2K85-67364)

These are the removal and installation procedures for the Carriage front bearing brushes.

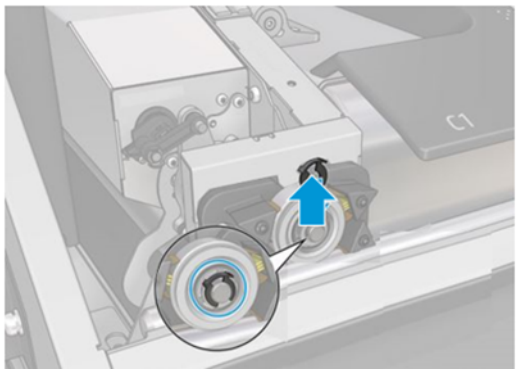
Table 10-7 Warning labels

Crush hazard	Risk of trapped fingers	Hazardous moving part
For more safety information, see Safety precautions on page 4		

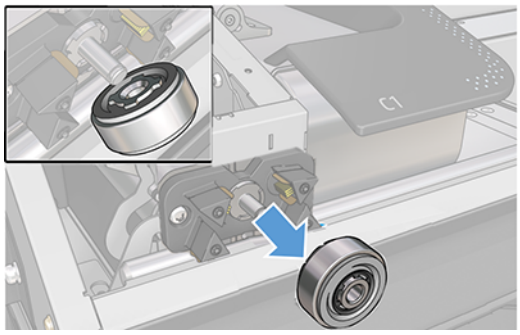
Removal instructions for the Carriage front bearing brushes

This is the procedure to remove: Carriage front bearing brushes

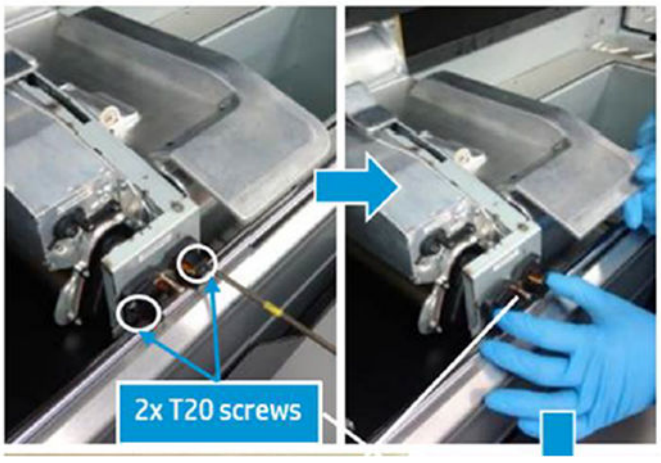
1. Remove the K-clip from the Fusing carriage front bearing.



2. Pull the bearing out.



3. Remove 2xT20 screws from the bearing brushes and put them in the zip bag, then remove the front bearing brushes assembly and put it in the Bearing kit box.



Lower trim grommets replacement (M2K82-67414)

These are the removal and installation procedures for the Lower trim grommets replacement.

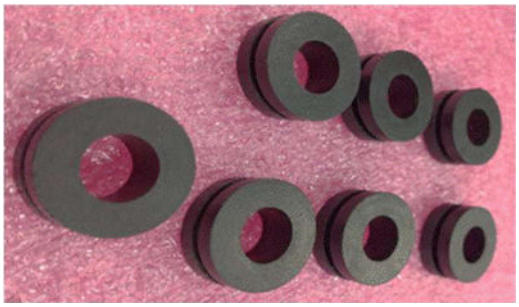
Table 10-8 Warning labels

Crush hazard	Risk of trapped fingers	Hazardous moving part
For more safety information, see Safety precautions on page 4		

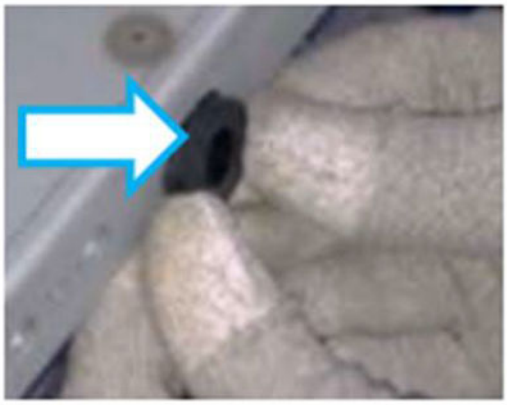
Lower trim grommets replacement

This is the procedure to remove: ower trim grommets replacement

The kit contains 9 grommets, but the printer requires only 7 (2x grommets on each side trim and 3 grommets on the front trim).

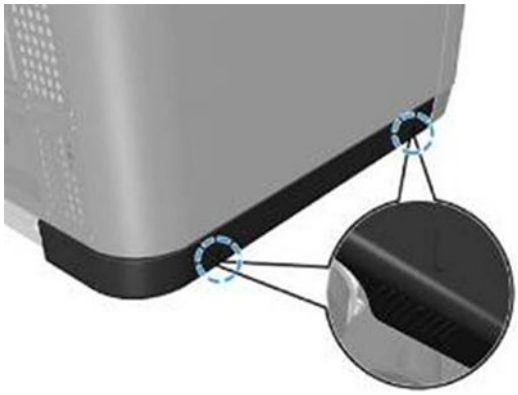


The grommets can be installed and removed by hand.



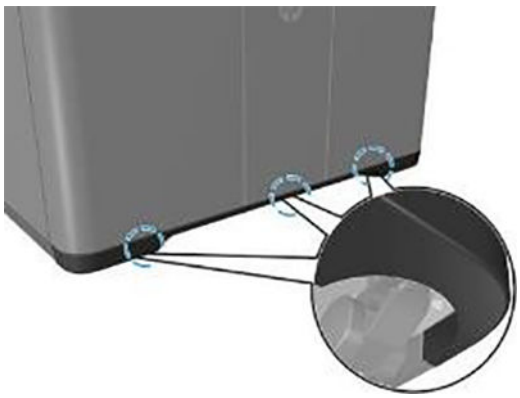
The grommets are located behind the trims (Look for the ribbed triangles in the trim as shown in the call outs below) also indicated with dashed line blue circles.

1. To replace left side grommets, remove the left lower trim first.
    - Look for the ribbed triangles under the trim that show where the grommets are.



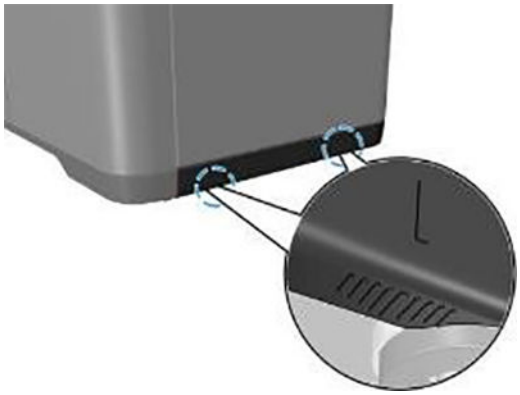
- Grab the trim close to the ribbed triangles and pull it away from the printer while keeping it horizontal.

2. To replace the front grommets, remove the front lower trims first.
   - Look for the ribbed triangles under the trim that show where the grommets are.

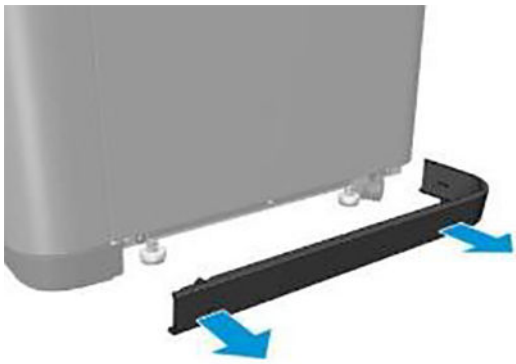


   - Grab the trim close to the ribbed triangles and pull it away from the printer while keeping it horizontal.

3. To replace the right-side grommets, remove the right-side lower trim first.
    - Look for the ribbed triangles under the trim showing where the grommets are.



    - Grab the trim close to the ribbed triangles and pull it away from the printer while keeping it horizontal.



Printing Carriage carriage-cover (M2K85-67290)

These are the removal and installation procedures for the Printing Carriage carriage-cover.

Table 10-9 Warning labels

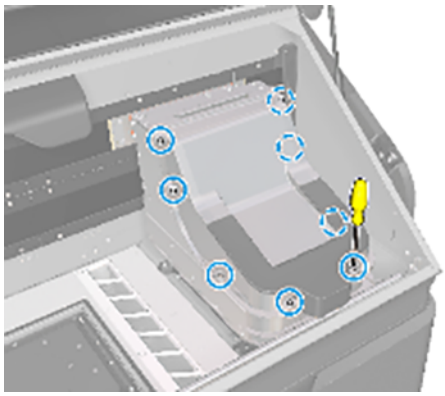
Crush hazard	Risk of trapped fingers	Hazardous moving part
For more safety information, see Safety precautions on page 4		

Removal

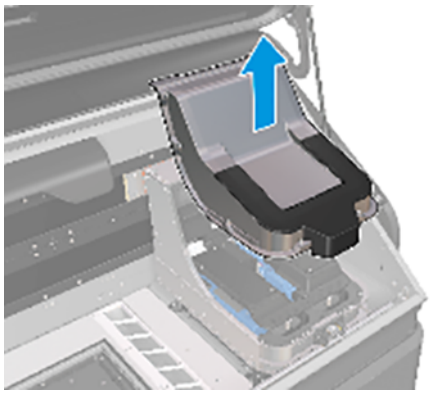
This is the procedure to remove: Printing Carriage carriage-cover

1. Open the Top access door.

2. Loosen 8 captive screws from the print carriage cover.



3. Remove the cover.



Installation

This is the procedure to install: Printing Carriage carriage-cover

1. Reverse the removal steps to install the assembly.
2. Execute the routine described in Customer Self Repair additional tasks before printing on page 74.

MRS Intermediate Tank (M2K85-67320)

These are the removal and installation procedures for the Build platform.

Table 10-10 Warning labels

Crush hazard	Risk of trapped fingers	Hazardous moving part
For more safety information, see Safety precautions on page 4		

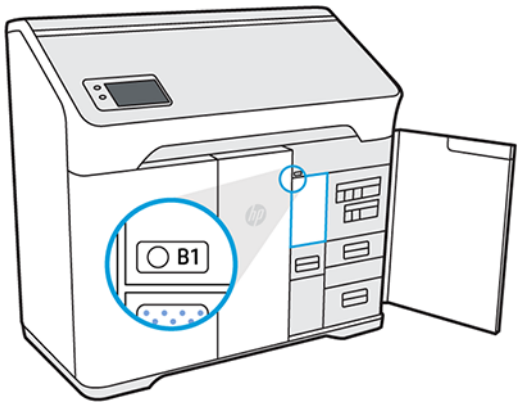
Removal

This is the procedure to remove: MRS Intermediate Tank

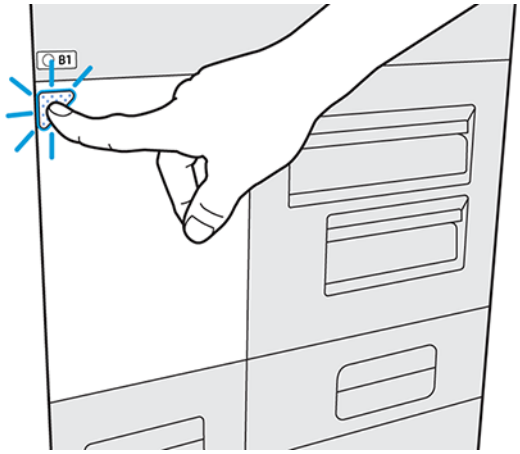
1. Press the Power button on the Control panel to turn off the printer and wait until the Formatter status LEDs go OFF before turning the Main switch to the OFF position.

2. Open the Agent door.

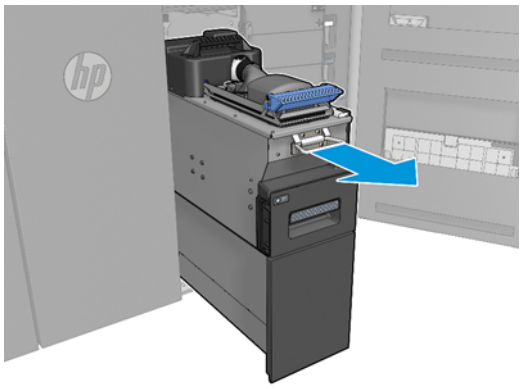
3. Open the reclamation filter by pushing the top left corner.



4. Check that the wayfinding LED is on, next to the access door to the reclamation filter.



5. Pull the MRS Intermediate Tank handle towards the front until the back of the hopper can be reached with your other hand.



6. Pull the hopper out then slowly lower it until the rear wheels touch the floor.

Installation

This is the procedure to install: MRS Intermediate Tank

▲ Follow the removal instructions in reverse order.

Customer Self Repair additional tasks before printing

These are the Customer Self Repair additional tasks before printing.

1. From the front panel, go to **Maintenance** > **Service Assist** > **1.0 System Tests** > **System Checks** > **Check All**.
2. Confirm the checking process finishes without errors.

How to recycle consumables and printed parts

NOTICE: Parts and waste generated during the printing process should be disposed of in compliance with federal, state, and local regulations. Consult your local authorities to determine the correct manner in which to dispose of waste. Also check with your local plastics recycler, as some printed parts may be appropriate for municipal recycling streams. Where appropriate, HP recommends that the parts be marked with the applicable plastic marking code according to ISO 11469 to encourage recycling.

HP provides many free and convenient ways to recycle your used HP hardware, cartridges, and other consumables. For information about these HP programs, see http://www.hp.com/recycle/.

The following consumables for your printer can be recycled through HP's Planet Partners Program, where available:

- Agent cartridges
- Lamps

Empty material cartridges can be recycled through commonly available recycling programs.

Dispose of the following supplies in compliance with federal, state, and local regulations:

- Full or partially full material cartridges
- Printhead cleaning roll
- Filters
- Printheads

HP recommends that you wear gloves while handling printer supplies.

11 Print

Indemnity to HP for 3D parts printed by the printer

The customer assumes all risk relating to or arising from the 3D printed parts. HP shall have no responsibility for any loss or damage caused by the 3D printed parts.

The customer shall defend, indemnify, and hold harmless HP from all third-party claims, losses, liabilities, costs, damages, judgments, awards, expenses (including but not limited to attorney's fees, expert witness fees, and bonds) arising out of the customer's or its customers and/or partners or end user's use, operation, distribution, sale, marketing, or possession of the 3D printed parts. HP shall provide prompt notification of the claim and cooperation with the defense.

Notwithstanding anything to the contrary contained herein or otherwise communicated to the customer, the customer is solely responsible for the evaluation of and determination of the suitability and compliance with applicable regulations of the products and/or 3D printed parts for any use, especially for uses (including but not limited to medical, dental, food contact, automotive, aerospace, heavy industry, and consumer products) that are regulated by US, EU, and other applicable governments. "3D printed parts" means any output or parts created, developed, and/or produced by the customer or its customers, partners, and/or other end-users from use of the products.

Cancel a job

If you need to cancel the job while printing, tap **Cancel print** and confirm it in the build status app on the printer's home screen. The printer will cancel the job after shutting down the current process.

Depending on the state the job is in when it is canceled, the printer may need to cool to a safe temperature before unlocking the top lid and allowing access to the print area.

Proceed with parts retrieval. If necessary, restart material conditioning: tap , then **Maintenance** > **Utilities** > **Start material conditioning**.

Check status on the front panel

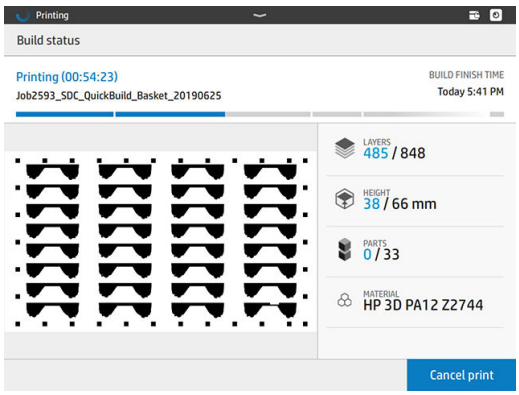
The build status app on the front panel's home screen shows you the status of the build currently being printed.

- Status of the job: A progress bar shows the whole printing process. The phases are warming up, printing, annealing, cooling, and reclaiming material.
- Estimated finishing time
- Job name
- Layers printed and layers in total
- Parts printed and parts in total

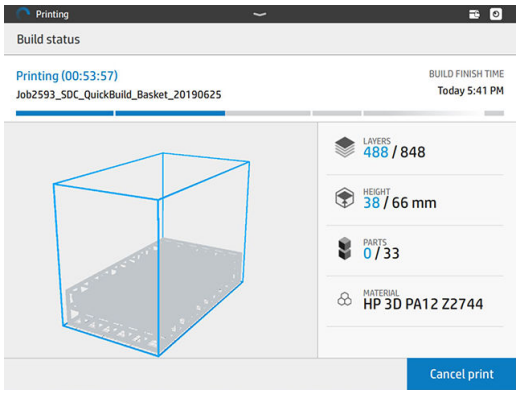
- Height printed and total height
- Material type

The front panel gives you three ways to monitor your job during printing:

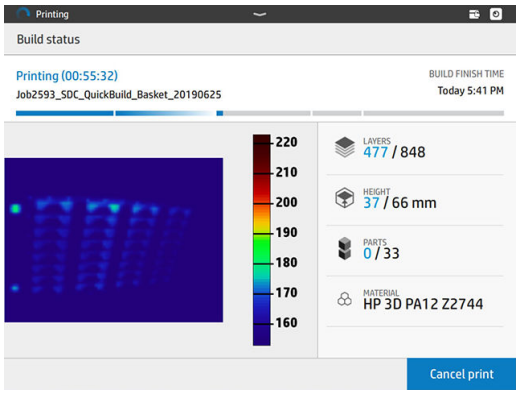
- Layer view, available only during printing



- Isometric view, available in all phases



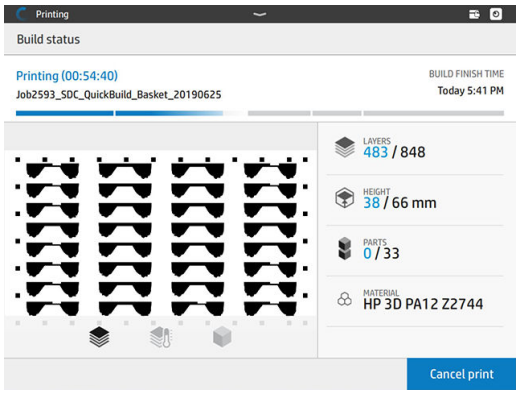
- Thermal camera view, available in all phases



NOTE: Thermal camera view images are uncompensated and should be used for reference only, not for diagnostic purposes.

You can navigate between the different options by tapping or swiping between the views.

Select the view area to show the tabs, swipe in the view area to move between views.



Check status remotely

You can check the job status from the Command Center.

HP SmartStream 3D Command Center on page 19

Possible errors while printing

- Print failed
- Cooling failed
- Annealing failed

IMPORTANT: If the air intake filter door is open while printing, the process will be cut automatically.

In the event of an error, the printer cancels the job immediately.

Proceed with retrieval if relevant.

NOTE: The printer needs to cool down before unlocking.

Printing and Cooling Profiles

Printing profiles:

- Mono Cosmetic: Optimizes quality over mechanical properties.
- Mono Balanced: The recommended mode when not requiring color output. Compared to Color Balanced, this mode produces parts with small improvements in the following attributes: whiteness, strength, and surface quality.
- Color Balanced: A balance between color quality and mechanical properties.
- Color Cosmetic: Optimizes color quality over mechanical properties.

Cooling profiles:

- Auto Cool & Reclaim: Automatic material reclamation with a longer cooling duration to optimize thin wall dimensional accuracy.
- Fast Cool & Reclaim: Automatic material reclamation with minimal cooling duration to optimize time to part.
- Natural Cooling: The build naturally cools without initiating automatic material reclamation. After a safe temperature is reached, the parts can be manually retrieved if they are thought to be too delicate for the auto extraction process.

Mix ratios:

- The minimum fresh material mix is 20%. 30% and 40% fresh material mix ratio options can be used when insufficient recycled material is available to complete a job.

12 Cooling and part retrieval

At the end of printing, a cooling period is required. After cooling, unused build material will be reclaimed automatically unless previously disabled within HP SmartStream 3D Build Manager. Light vibration and airflow will remove unused build material for later reuse. Following material reclamation, the front panel notifies you that parts are ready to be retrieved.

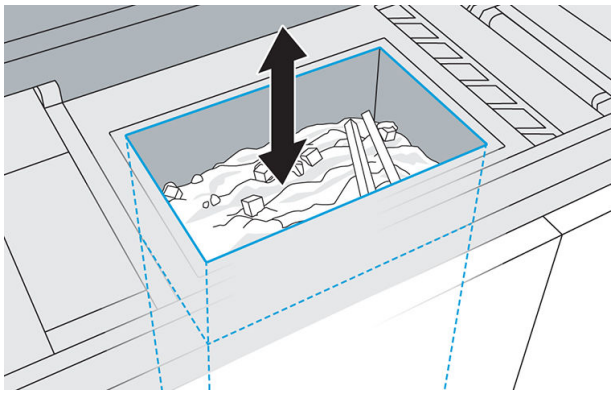
Parts may be retrieved early, after a safe cooling period. Early retrieval may degrade part quality and is not recommended. The top cover will remain locked until parts have reached a safe temperature.

NOTE: Parts will still be hot to the touch. Safety gloves are recommended.

If any residual material remains in the build chamber after parts retrieval, there is an option to perform additional reclamation.

Part retrieval

1. Tap **Retrieve parts** or **Finish build** in the build status app.
2. Open the top cover.
3. Use the up and down buttons to raise or lower the platform to make the part retrieval process more convenient.



CAUTION: Tall, vertically-oriented parts could fall over and become wedged while the platform is being raised. If this happens, stop and rearrange parts before continuing to raise the platform. The printer may disable further platform movement until the next job.

CAUTION: Wear safety gloves. The parts may be hot.

4. For optimal part and color quality, remove each part with all attached material. Do not allow any excess material to fall back into the build chamber.

CAUTION: Do not brush or forcibly scrape loose material attached to the parts back into the build chamber.

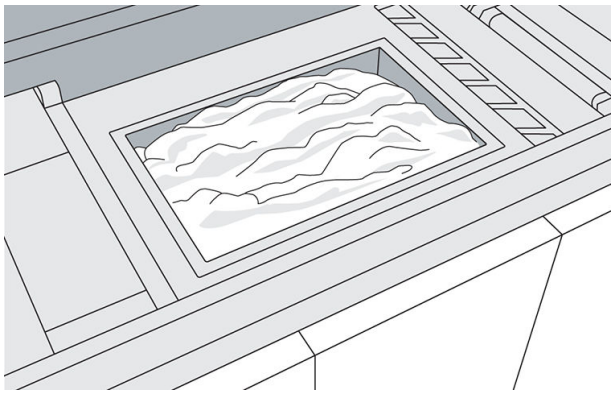
5. Continue until all parts are retrieved from the build chamber. Use the buttons to lift the platform to reach all parts.

⚠ CAUTION: If you see colored material in the build chamber, use an explosion-protected vacuum cleaner to remove this colored material, so that it will not be reclaimed and recycled in future builds.

6. After parts have been removed from the printer, additional cleaning with hands or a brush may be used before bead blasting. This will preserve the color of the final parts as well as the lifespan of the beads and filters. This material may not be returned to the printer as it will compromise the part quality of subsequent builds.

7. Material may remain on the build platform. Additional reclamation may be initiated by pressing the **Reclaim and Finish** button.

NOTE: All doors, and the top cover, must be closed before starting to reclaim material.



⚠ CAUTION: Do not reclaim material that has been fused or colored.

NOTE: Some material may remain at the edges or frame of the platform.

Once the front panel tells you that the process has finished, you may want to check whether all material has been reclaimed. To remove any remaining material, use an external explosion-protected vacuum cleaner.

8. With all parts clean and excess material reclaimed, resume normal printing.

Keeping the printer clean

If a significant amount of material falls from the top cover after a build, the following precautions may be useful:

1. Tap along the front of the top cover before opening it.
2. Slowly open the top cover about 25 cm (10 in), and use an explosion-protected vacuum cleaner with a soft-brush nozzle to remove material from the edge of the cover.
3. Continue opening the cover slowly, without releasing it, until it is fully open.
4. Vacuum the interior surface of the cover to remove any remaining material.
5. Place a vacuum hose near the top of the build chamber to remove dust during parts retrieval.

13 Post-processing

Once parts have been retrieved from the printer, they should be cleaned of excess material. HP recommends removing loose excess material and large clumps of material from each part before bead blasting. This will preserve the color of the final parts as well as the lifespan of bead-blaster filters and glass beads. After this loose material is removed, the remaining material will have to be removed in a bead- and air-blast machine. All parts should be bead blasted (first) and air blasted (second).

- Bead blasting consists of applying compressed air mixed with an abrasive material to the part in order to remove the attached material.

  HP recommends blasting parts with glass beads of diameter 210–297 µm (50–70 mesh).

- Air blasting consists of applying compressed air to the part in order to remove any material remaining after bead blasting.

The following options are available for color-related finishing:

- Color bleed: MJF parts can be made "water-fast" so the surface colors will not bleed together when exposed to water if a wax coating is applied through the HP recommended process.
- Wax coating: The part is coated in liquified paraffin or soy wax and baked in a low-temperature convection oven so that surface colors will no longer bleed together when the part is exposed to water. See the document *Applying wax coating to color MJF parts* in the 3D Center Knowledge Zone for instructions.
- Dyeing: The part is immersed in a controlled dyeing bath. All details and cavities of the part can be reached. See the document on *Manual Dyeing of White Parts* in the 3D Center Knowledge Zone for dyeing instructions.
- Painting: The part is painted with a spray can, spray gun, or brush. For specific color finishing, HP recommends applying a primer before painting the part. Repeat the process several times for optimal results.

Depending on your specific needs, other postprocessing methods may be suitable for you, including:

- Hand sanding: The surfaces of the part are smoothed by abrasion with sandpaper
- Clear coatings for wear resistance, water resistance, gloss, and so on
- Gluing, bonding, and sealing
- Drilling, tapping
- Coloring of monochrome parts, including dyeing and painting

Contact your service representative to discuss solutions for your specific needs.

Consult your usual EHS specialist for advice on the appropriate measures for your location depending on the post-processing method you use. Consult your local authorities to determine the correct manner in which to dispose of wastes.

14 Troubleshooting

Network troubleshooting

Link issues

If the printer fails to connect to the network, both LEDs will be off. In this situation, try the following steps:

The printer has status lights (LEDs) beside the network connector that indicate the link status and network activity.

- When the green light is on, the printer has successfully linked to the network.
- When the yellow light is blinking, there is transmission activity over the network.

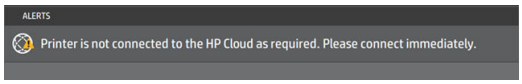
1. Check the cable connections at both ends.
2. Consider replacing the cables with ones that are known to work.
3. Consider switching to another network connector in the network switch, hub, or device to which the printer is connected.
4. Manually configure the link setting to match the port configuration of the network hub or switch.
5. In case of doubt or misconfiguration of link settings, reset the network parameters to their factory settings.

Restore factory settings

In the case of accidental misconfiguration, you can reset the network settings to the factory defaults by tapping **Restore factory settings** in the Network Settings configuration menu.

Network connectivity

If your printer detects that it is not connected to the HP Cloud via HP SmartStream 3D Command Center, a warning will appear on the front panel.



If this problem persists, you may be unable to send new jobs to print. Please run the diagnostics explained in the network troubleshooting guide. If you cannot find this guide, contact your support representative.

For more guidance about checking your network connection, see the site preparation guide.

Start-up issues

The printer has three status lights (LEDs) beside the network connector that indicate the start-up status.

These LEDs can help the remote support agent to understand potential root causes in case the printer fails to start up.

The LEDs are arranged vertically.

If the printer fails to start up and announce itself as Ready, and the front panel is unresponsive, call your support representative and describe the status of these three LEDs.

Power-on issues

The printer has three status lights (LEDs) beside the power-cord panel that indicate the start-up status.

These LEDs can help the remote support agent to understand potential root causes in case the printer fails to power on.

The LEDs are arranged vertically.

If the printer fails to power on, and the front panel is blank, call your support representative and describe the status of these three LEDs.

Agent troubleshooting

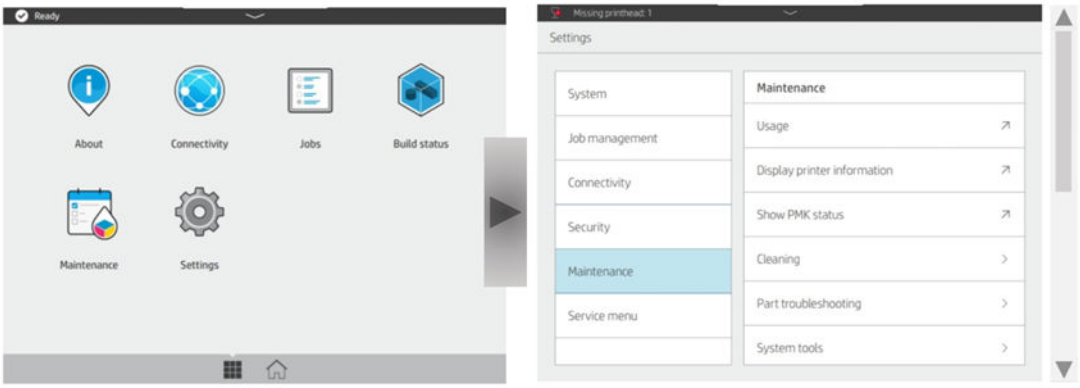
Procedure

1. Check that the agent is designed for your printer.
2. Use the correct procedure to change agents, through the front panel.
3. Check that there is no obstruction in the agent slot.
4. Check that the agent is of the correct type and color.
5. Check that the agent is correctly oriented (compare with another agent).

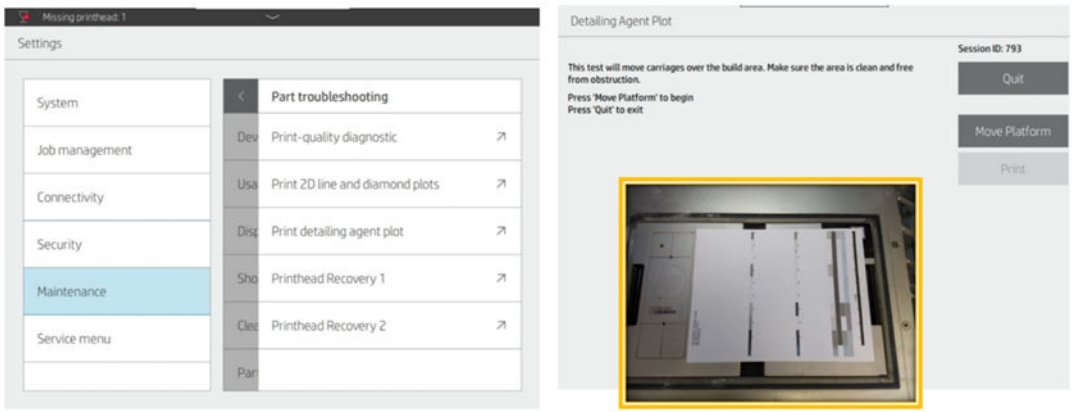
6. Ensure that you have inserted the agent correctly and fully, and that it is latched. You should hear a click.
7. Ensure that every agent slot has a supply installed. If one supply is left out of the machine, the workflow will fail.
8. If the problem still remains, call your support representative.

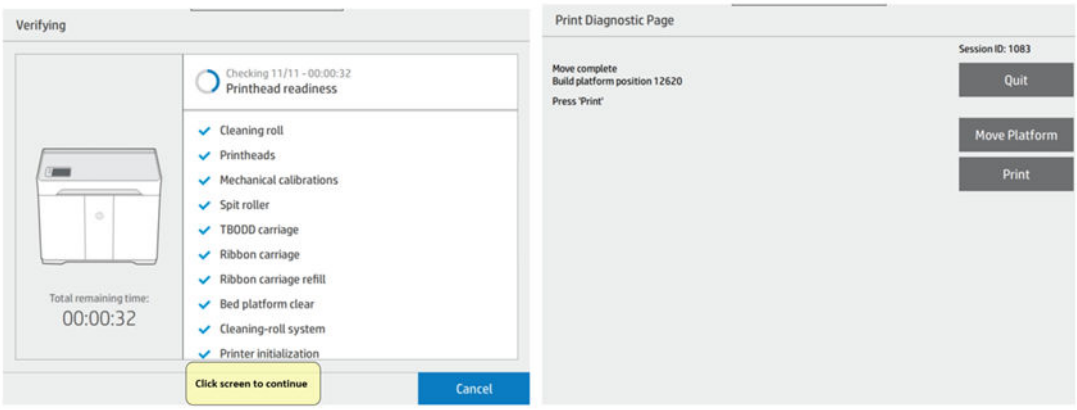
Print a Detailing Agent Plot

1. From Control Panel, choose **Setting** > **Maintenance** > **Part troubleshooting** > **Print detailing agent plot**:

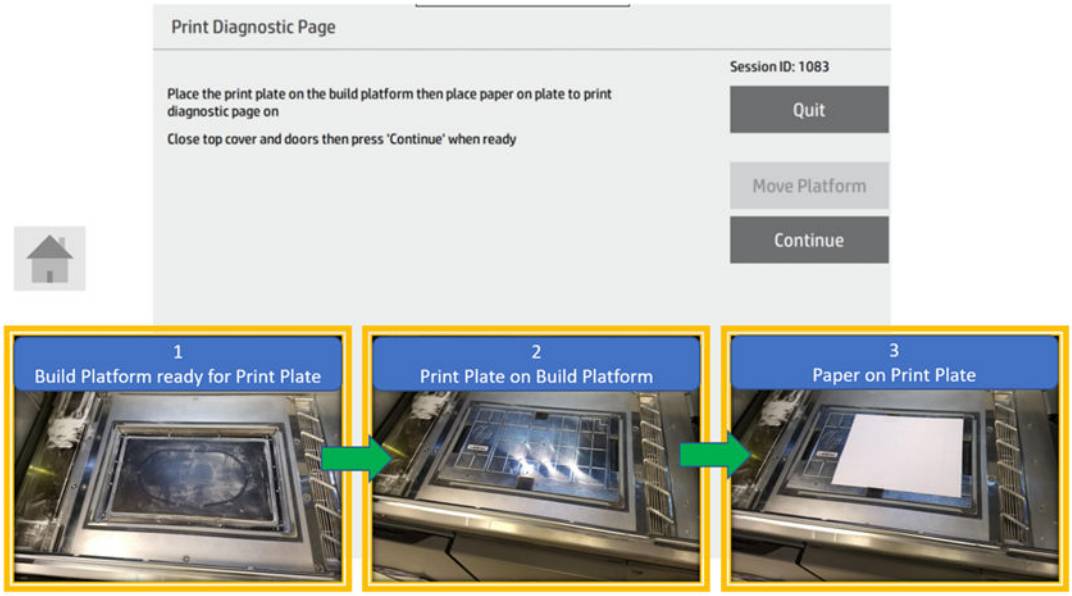


2. Press **Move Platform** to begin:

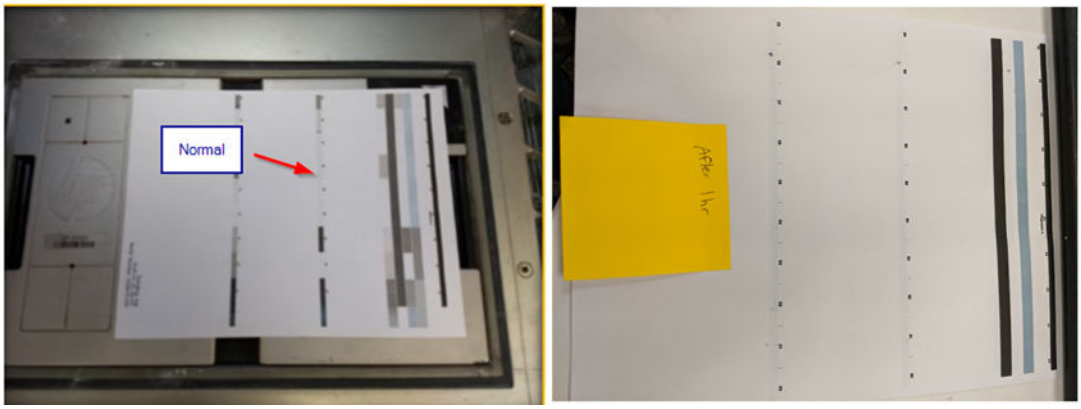




3. Place the Printhead Alignment Plate, and place a piece of paper on it.



4. The first section is the same as Print Quality Diagnostic Plot. This new DA plot allows you to see chunks of nozzle out better, while the DA high flow rate plot tends to oversaturate. The second following picture shows a healthy DA plot:



Material cartridge troubleshooting

1. Check that the cartridge is designed for your printer.
2. Check that the cartridge contains the correct type of material and that it matches the slot type (fresh or reusable material).
3. Use the correct procedure to change cartridges, through the front panel.
4. Check that you have removed the cartridge cap.
5. Check that there is no obstruction in the cartridge connector in the slot.

6. Check that the cartridge is correctly oriented (compare with another cartridge). The flat side should be facing down when inserting the cartridge into the printer.
7. Ensure that you have inserted the cartridge correctly and fully. You should hear a click.
8. If the problem still remains, call your support representative.

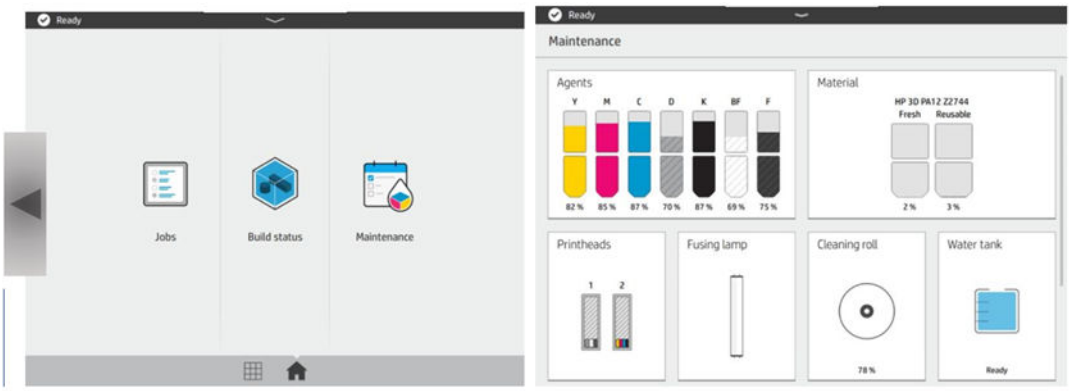
Printhead health troubleshooting

Printhead Health Gauge front-panel messages

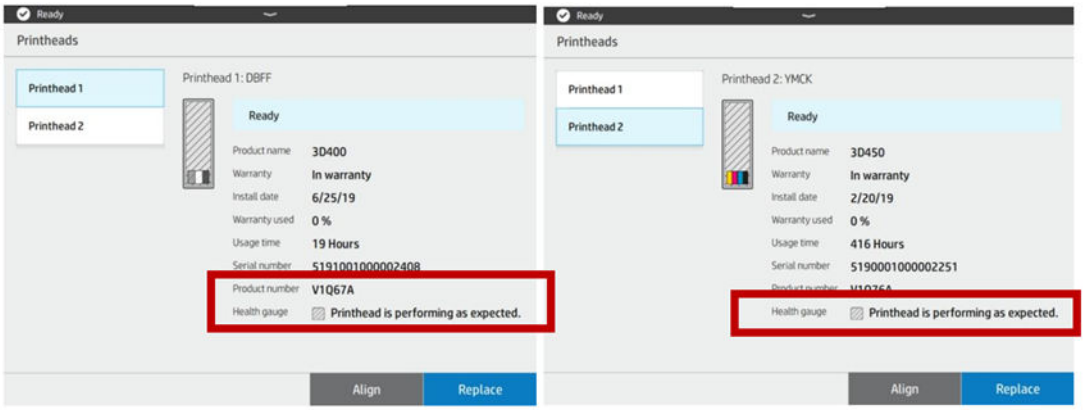
You can check the Printhead Health Gauge for the status of a printhead. To do so:

Procedure

1. Verify the status of the Printhead Health Gauge in **Maintenance** > **Printheads**.



2. Check the Printhead Health Gauge for both Printhead 1 (Mono Printhead) and Printhead 2 (Color Printhead):

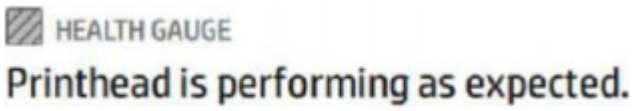


How to update the Printhead Health Gauge status

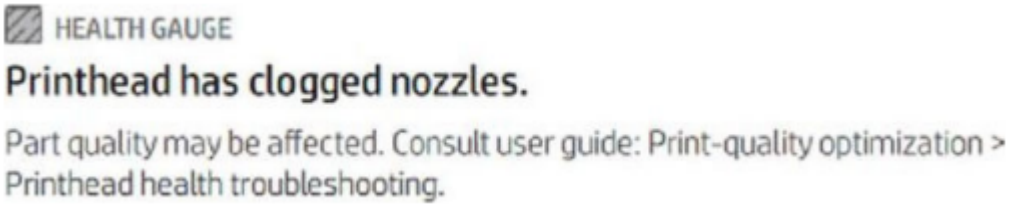
The following three activities can be used to reset the Printhead Health Gauge:

The Printhead Health Gauge has three levels:

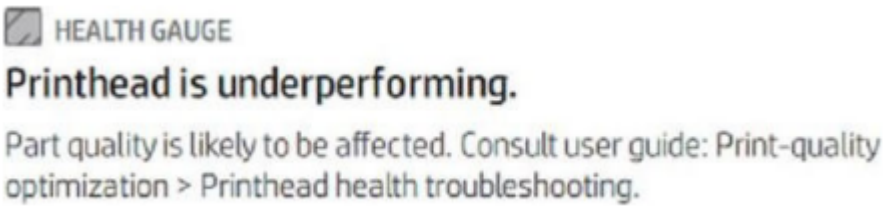
- There is no problem with the printhead nozzles.



- The printhead has relatively few clogged nozzles. This is unlikely to produce any defects in printed parts, but possible.



- The printhead has several clogged nozzles, which may produce defects in the printed parts.



Known Issue on the Printhead Health Gauge

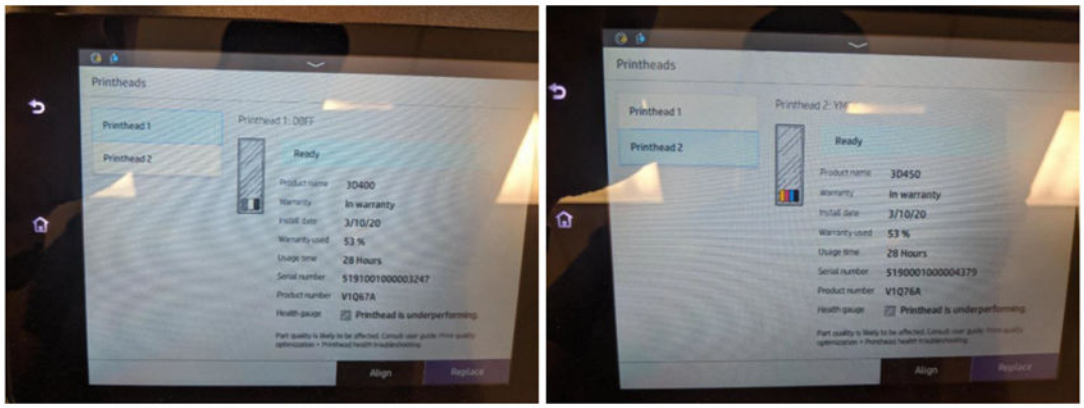
- Printhead Health Gauge status displays “Printhead is underperforming.”

  The status of the Printhead Health Gauge (**Control Panel Home** > **Maintenance** > **Printhead**) displays “Printhead is underperforming” even after a new Printhead is installed and the Printhead Replacement flow has been followed. The Printhead Health Gauge status is an indication of the printhead nozzle health.

IMPORTANT: The Printhead Health Gauge status ONLY gets updated after the printer performs a Drop Detect procedure. There are three ways the printer can perform a Drop Detect procedure:

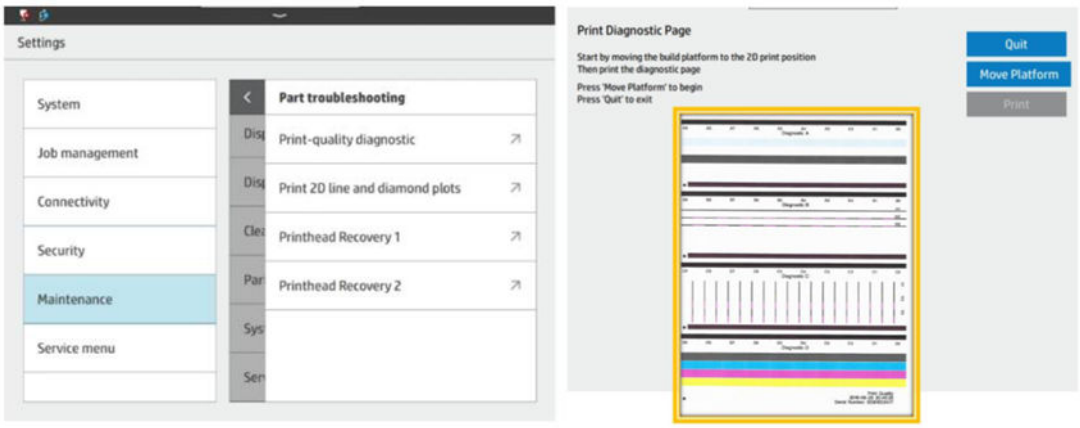
1. Print a job.
2. Run the diagnostic test 1.1 from **System Checks** > **Check All**.
3. Run the diagnostic test from **Nozzle Health Test: Mono Pen or Color Pen**.

See the following for more details.



- Troubleshooting:

  If the status of the Printhead Health Gauge shows “Printhead is underperforming”, verify the Printhead Nozzle Health of all agents except DA by printing the Print Quality Diagnostic Page in **Maintenance menu** > **Part troubleshooting** >**Print-quality diagnostic**:



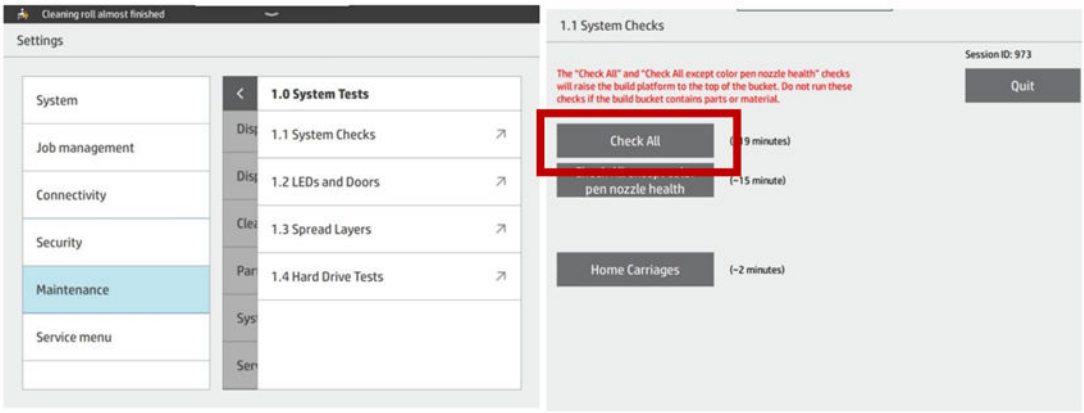
  - **If Print Quality Diagnostic Page looks good**: In order to check the DA Nozzle Health, run the Nozzle Health Test from the Control Panel in **Service Menu** > **7.0 Drop Detect** > **7.3 “Drop Detect Calibration and Nozzle Health Test”** > **Nozzle Health Test: Mono Pen**.
  - **If the Print Quality Diagnostic Page looks good and DA Nozzle Health shows OK**: Ignore the message “Printhead is underperforming” in the Printhead Health Gauge. This is a firmware bug in new printhead replacement in firmware VULCAN_05_19_35.26 (BD5) and after (BD5.1). The fix will be implemented in FW VULCAN_06_20_06 (BD6) for new printhead replacement workflow.
  - **If the Print Quality Diagnostic Page looks bad or the DA Nozzle Health Test shows RA or OUT**: Follow the Print Quality Troubleshooting Guide and Run Printhead Recovery Routines to recover the Printhead.

1. Print a job.

   After printing a job, the Printhead Health Gauge will be reset since Drop Detect is run before the print job.

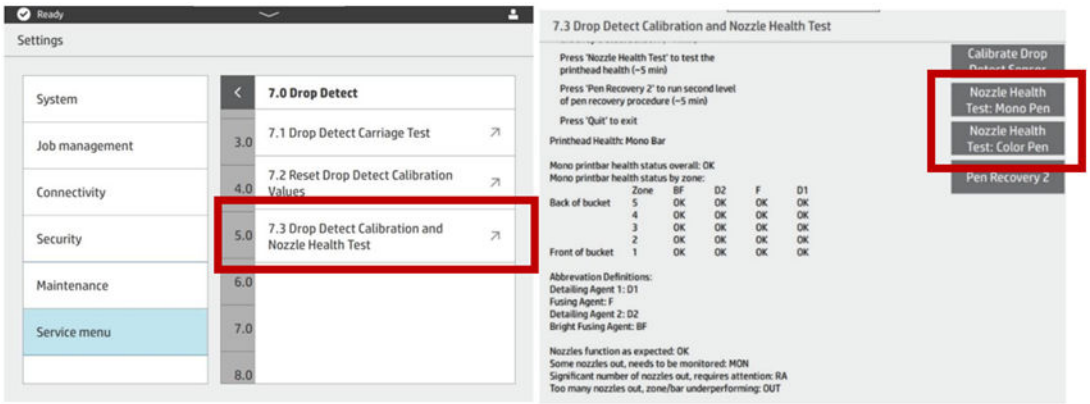
2. Run Check All:

   In **Service Menu** > **1.1 System Test** > **1.1 System Checks** > **Check All** (Do not run Check All except for color pen nozzle health).



3. Run Nozzle Health Test:

   From Control Panel, run **Service Menu** > **7.0 Drop Detect** > **7.3 Drop Detect Calibration and Nozzle Health Test** > **Nozzle Health Test: Mono Pen or Color Pen**.

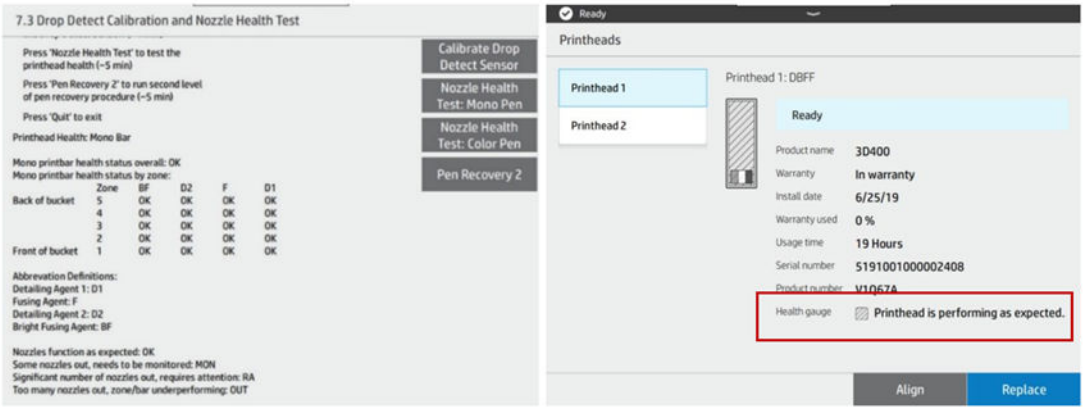


Examples of Nozzle Health Test results vs Printhead Health Gauge

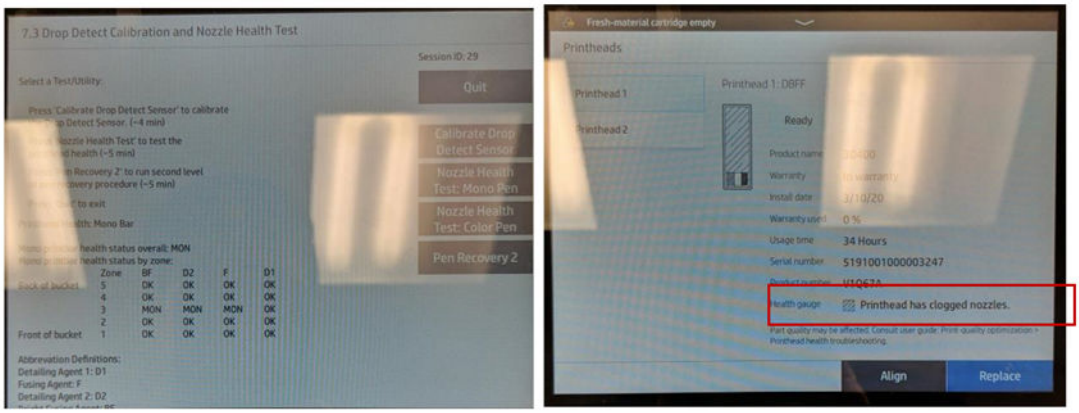
The match between Nozzle Health Test results and Printhead Health Gauge is shown as follows:

- OK = “Performing as expected”
- MON = “Clogged Nozzles”
- RA or Out = “Underperforming”

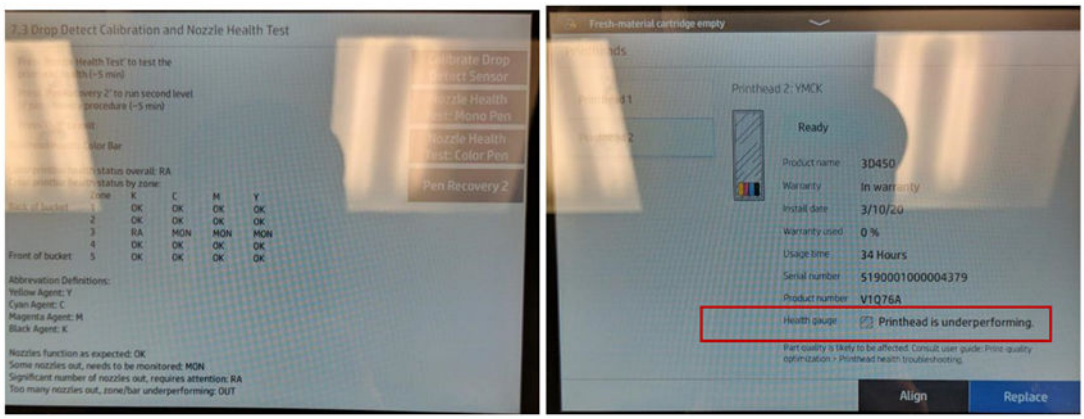
1. There is no problem with Printhead Nozzles: The Nozzle Health Test shows OK in every zone. The Printhead Health Gauge will show “Printhead is performing as expected:”



2. Printhead has relatively few clogged nozzles: The Nozzle Health Test shows MON in any zone. The Printhead Health Gauge will show “Printhead has clogged nozzles:”



3. Printhead has several clogged nozzles, which may produce defects in the printed parts: The Nozzle Health Test shows with RA or Out in any zone. The Printhead Health Gauge will show “Printhead is underperforming:”



Troubleshooting

There are two main tools for investigating clogged nozzles:

- Checking the Nozzle Health Test as part of the Drop Detect Calibration. See Nozzle Health Test and Drop Detect Calibration on page 92.

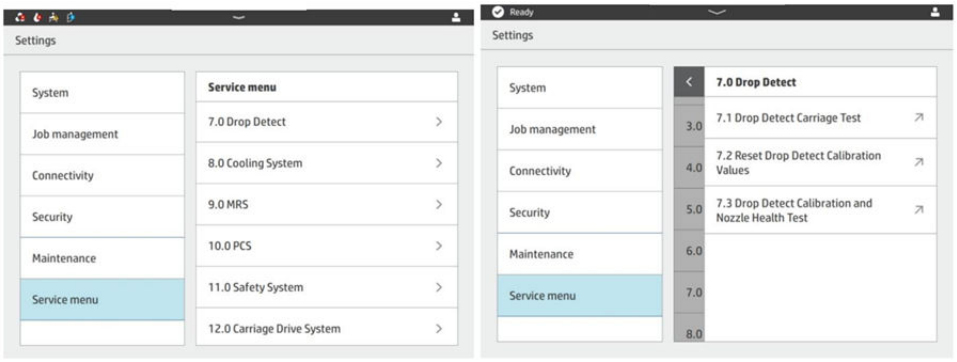
- Printing the Print Quality Diagnostic.

Nozzle Health Test and Drop Detect Calibration

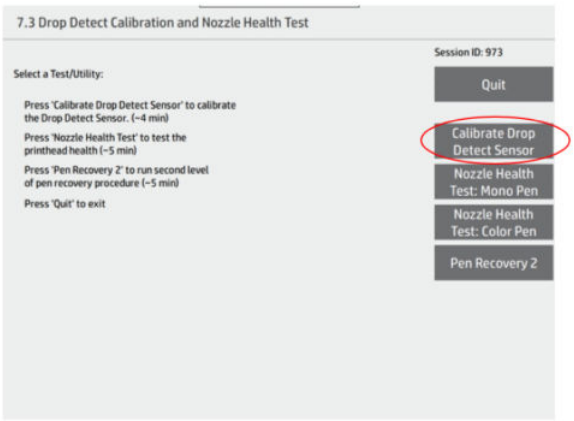
Test can be accessed via the Service Assist menu.

Procedure

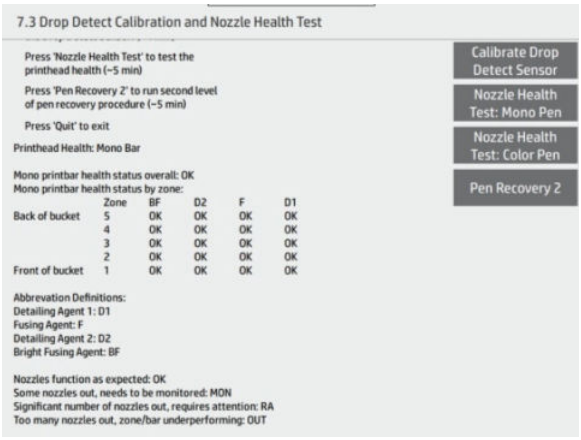
1. From the Control Panel, run **Service Menu** > **7.0 Drop Detect** > **7.3 Drop Detect Calibration and Nozzle Health Test**:



2. First, calibrate the Drop Detect Sensor.



3. If the calibration fails, then it is likely that the sensor is giving false data. This will not stop a job from printing.
   - To determine if the nozzle health is good, skip to the Print Quality Diagnostic
   - It is recommended to call HP Support to resolve this calibration error.
4. After calibration, run the Nozzle Health Test on desired bar—Mono (D, BF, F) or Color (Y, M, C, K).
   - Results of test are displayed as a table with 4 possible results:



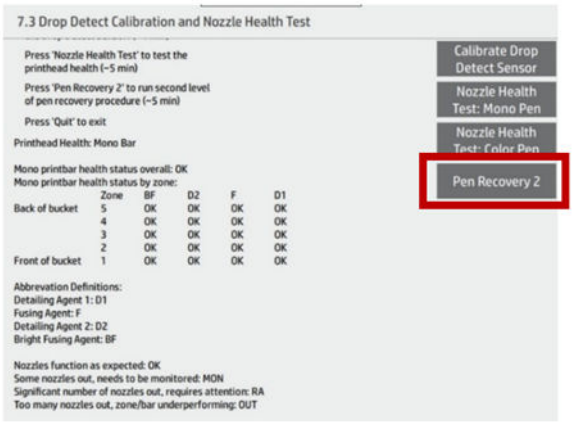
- Results of “OK” and “MON” mean almost no nozzles, or only a few nozzles out, where part quality is unlikely to be affected.
- A result of “RA” means that part quality is likely to be affected in the given region.
- A result of “OUT” means that part quality is very likely to be affected in a larger area.

5. Zones in the Nozzle Health Test Results vs Sections in the Print Quality Diagnostic Plot:

Table 14-1 Nozzle Health Test Results vs Sections in the Print Quality Diagnostic Plot

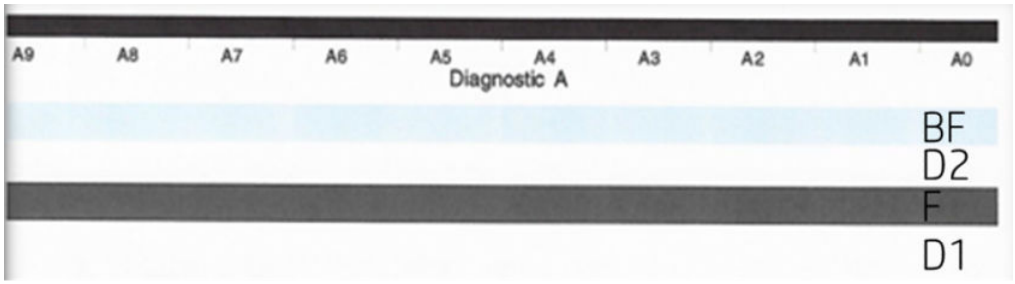
Zone # of Nozzle Health Test	Section # of Mono Bar	Section # of Color Bar
Zone 1	A0 & A1	D0 & D1
Zone 2	A2 & A3	D2 & D3
Zone 3	A4 & A5	D4 & D5
Zone 4	A6 & A7	D6 & D7
Zone 5	A8 & A9	D8 & D9

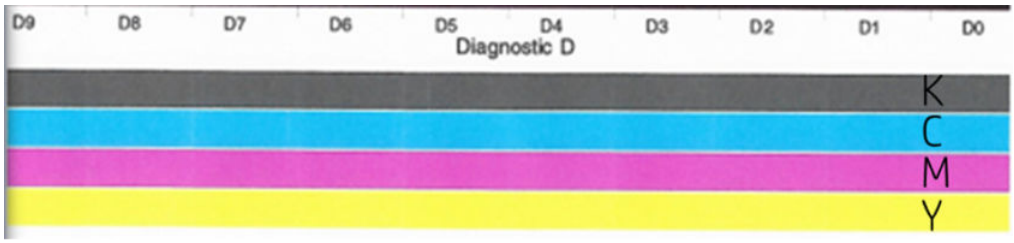
6. Run the Pen Recovery 2 Test to recover printhead health if you see any nozzle health issues:



How to correlate printed part quality defects to Nozzle Health Status or Part Quality Diagnostic

The Mono Bar corresponds to Diagnostic A of the Print Quality Diagnostic, and the Color Bar to Diagnostic D of the Print Quality Diagnostic:





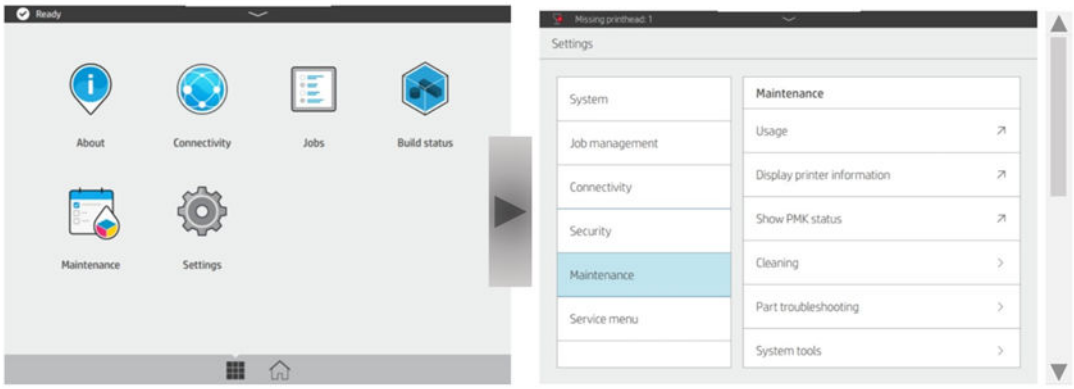
- Bright Fusing: Missing nozzles will appear as troughs or divots in the part in the direction of the print carriage. May also appear as missing color, since this agent is used to affix color to the outside of parts. Strength of small features may be affected, if nozzles are lined up in that region.
- Detailing Agent: Missing nozzles can appear on parts in many ways. Some possibilities include overfusing or thermal bleeding, washed out colors, or dimensional mismatches in cases such as fitting two parts together or the inability to clear out small holes.
- Fusing Agent: There is significant margin in the system to compensate for missing nozzles of this type, but possible impacts would be: a decrease in internal strength and/or pockets of unfused material trapped on the inside of a part.
- Colors (KCMY): Only cosmetic appearance will be affected by color nozzles being out, and always along the axis of the print carriage. Symptoms include color non-uniformity or completely missing color.

Printhead troubleshooting

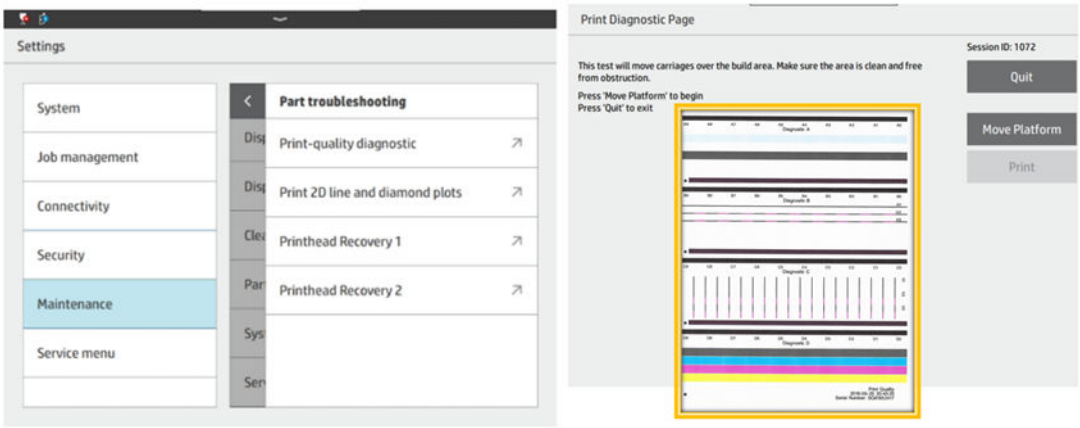
Use these instructions to troubleshoot print quality defects observed on a Quality Diagnostic Page.

Procedure

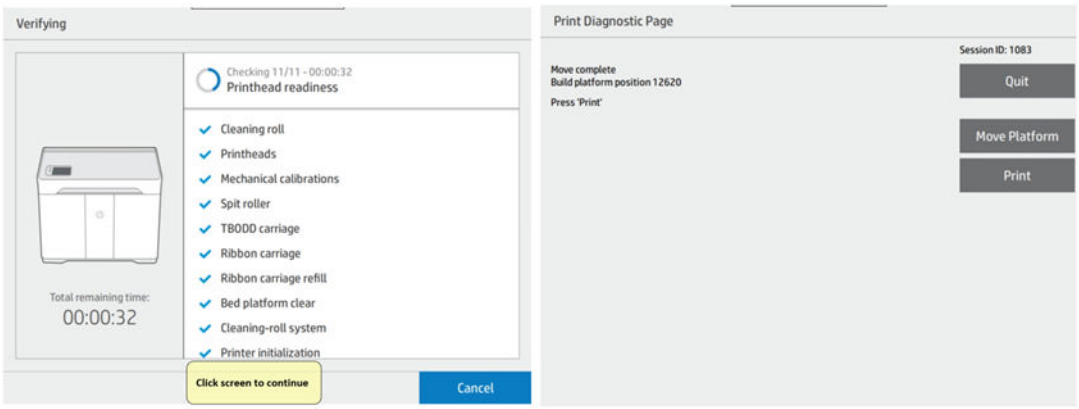
1. When evaluating print defects on paper, always print the Quality Diagnostic Page under the Maintenance menu > **Part troubleshooting** > **Print-quality diagnostic**.



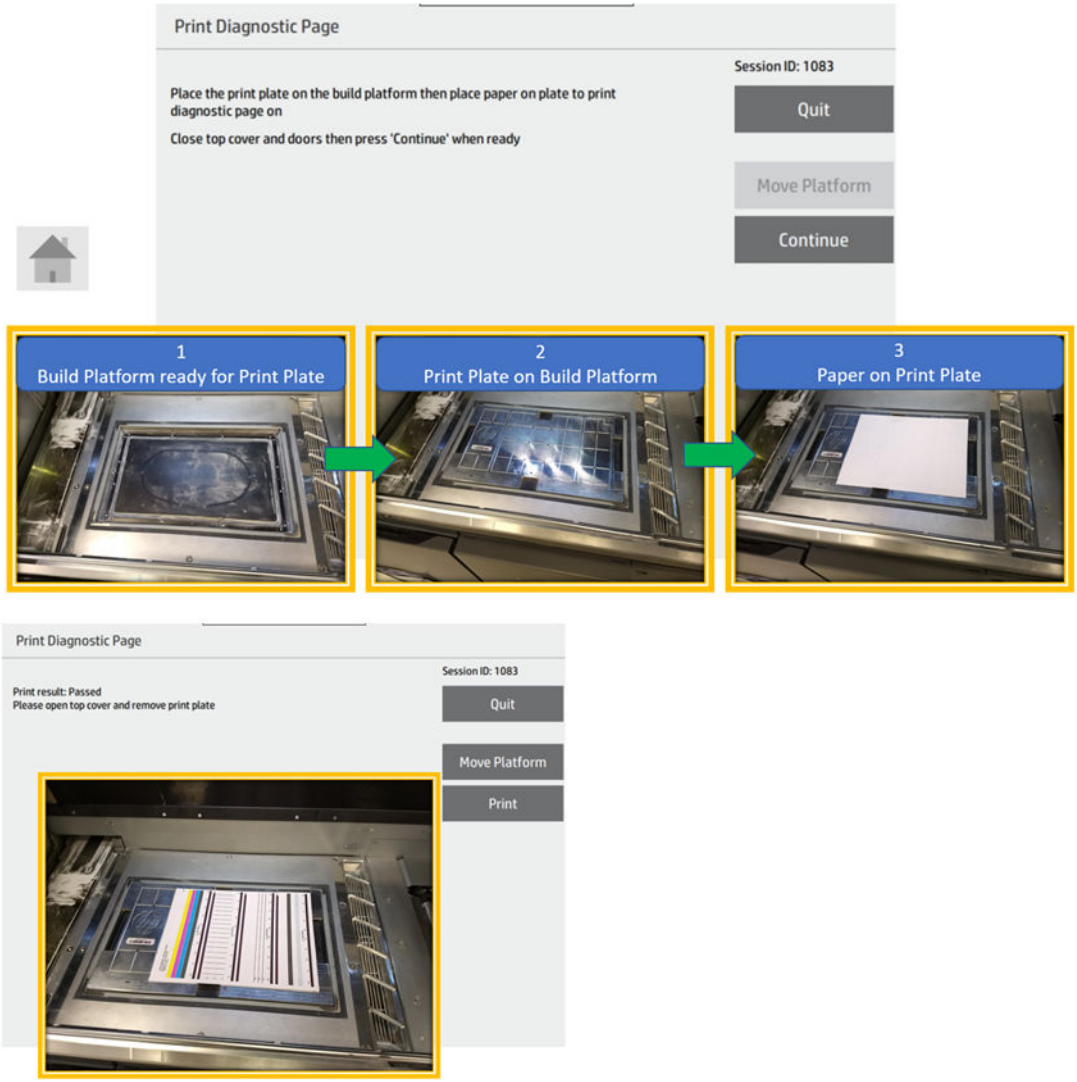
2. Press **Move Platform** to begin.



3. When the screen displays "Move complete," press **Print**:



4. Place the print plate on the build platform, then place a sheet of paper on the plate to print the diagnostic page on.



Use the table below to identify the defects on the Diagnostic Page. Note that the sections on the Diagnostic Page are identified by letters A, B, C and D.

Print another Diagnostic Page after performing any of the recommended actions and use the Diagnostic Page to compare before and after recommended actions.

Table 14-2 Problems

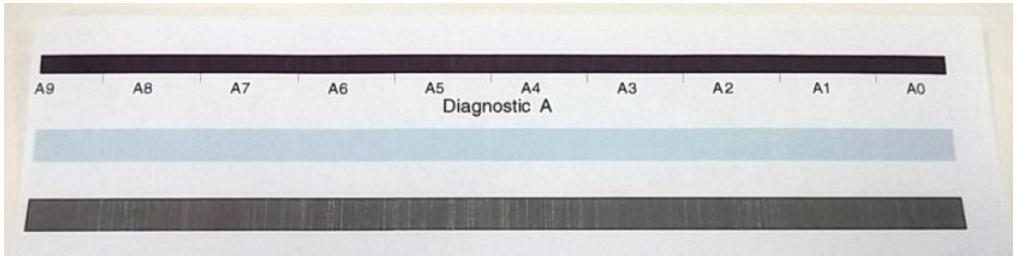
Problem descriptions
Random white lines in Diagnostic A or D. See Random white lines on page 97.
Agent Mixing in Diagnostic A or D. See Agent mixing (recoverable) on page 97.
Large Missing Block in Diagnostic A or D. See Large missing block on page 98.
Unrecoverable Pen Communication Error. See Unrecoverable printhead malfunction errors 0085-0070-0001 & 0085-0071-0001 on page 98.
Staggered lines in Diagnostic B or C, consistent across the page. See Staggered lines on page 99.

Random white lines

Table 14-3 Random white lines

Problem description	Possible causes	Recommended actions
Lots of random missing nozzles, seen as white streaks in the area fill section of Diagnostic Page sections A or D	material blocking nozzles	1. Check Printhead Health Gauge Status from the UI. 2. Run Printhead recovery routine on page 100. 3. If plot is unchanged, the material is likely permanently stuck inside the nozzles. Printer has built in robustness to combat this defect and it should not affect part quality. 4. If 3D part quality is unaffected, then the printhead is OK and does not need to be changed.

Diagnostic A defect sample:



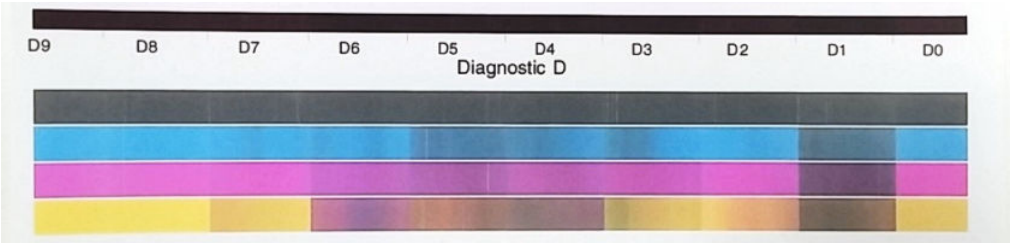
Agent mixing (recoverable)

Table 14-4 Problems

Problem description	Possible causes	Recommended actions
The color of the agent is wrong.	1. Printhead crashing into material. 2. Particles on the die bridges 2 agent slots, allowing agent to transfer back and forth between slots. 3. Material buildup inside the cap touching the printhead. 4. Extended idle times.	1. Clean the cap thoroughly. 2. Run the Printhead recovery routine on page 100 to clear the agent mixing. 3. If the agent mixing returns repeatedly at the exact same location, then call HP support and describe repeated mixing.

Diagnostic A defect sample:

Diagnostic D defect sample:

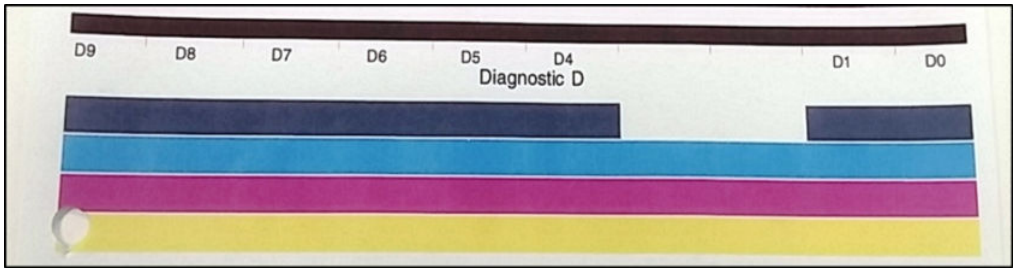


Large missing block

Table 14-5 Problems

Problem description	Possible causes	Recommended actions
Large missing block in section A or D	1. Printhead crashes into material and BF and FA agents mix (BF reacts with FA and forms sludge). 2. Extended idle periods without using Away mode. 3. Part dragging/lifting, hits the printhead, then tears printhead die surface.	1. Run the Printhead recovery routine on page 100. 2. If issue persists after multiple recovery attempts, call HP Support.

Diagnostic A defect samples:

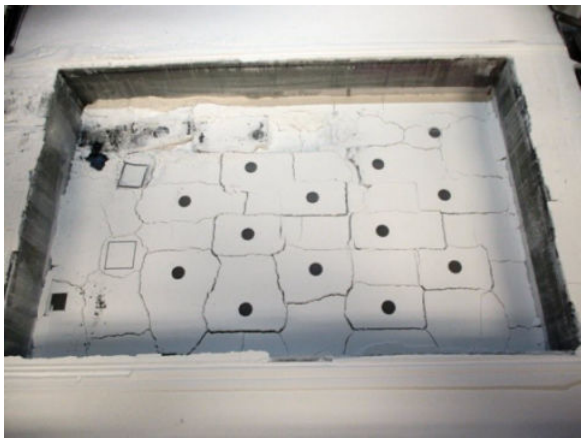


Unrecoverable printhead malfunction errors 0085-0070-0001 & 0085-0071-0001

Table 14-6 Problem

Problem description	Possible causes	Recommended actions
Unrecoverable printhead malfunction errors	Debris in chamber causes fused material to hit printhead, causing electrical damage. Can be caused by part lifting, or clogs in perimeter vacuum, or other parts in chamber.	1. Restart the machine to confirm error. 2. If issue persists after multiple attempts, call HP Support.

Build chamber view showing part dragging:

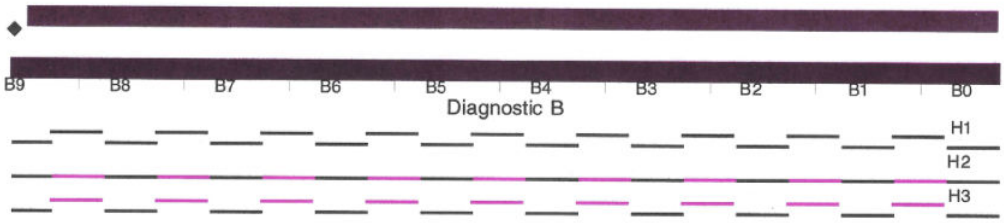


Staggered lines

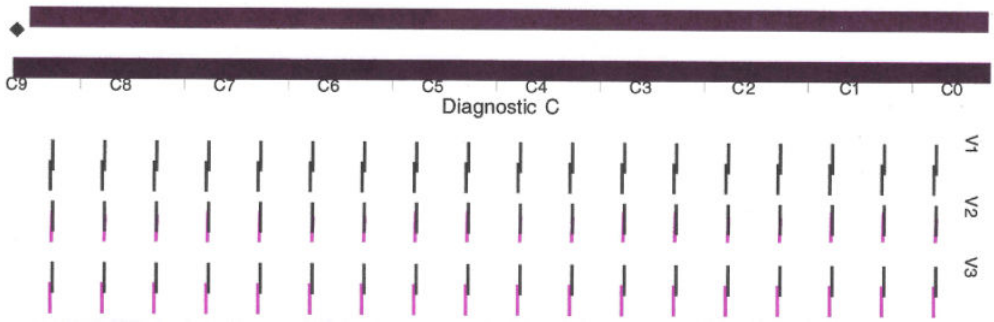
Table 14-7 Problem

Problem description	Possible causes	Recommended actions
Staggered lines in Diagnostic B or C, consistent across the page	1. Printhead misalignment. 2. Printhead-to-paper spacing drift. 3. Paper curl skewed by carriage.	1. Run the Printhead alignment on page 100. 2. Check Carriage Encoder test.

Staggered lines in B:

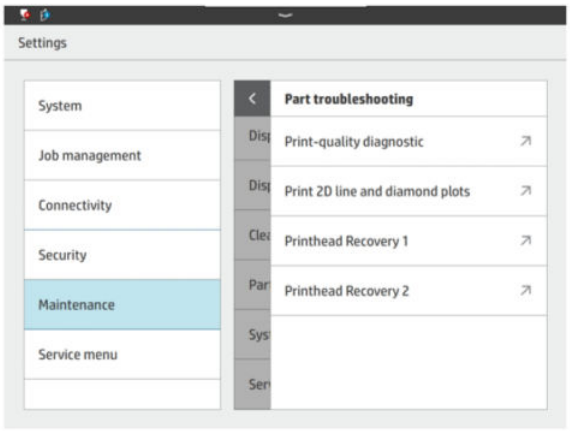


Staggered lines in C:



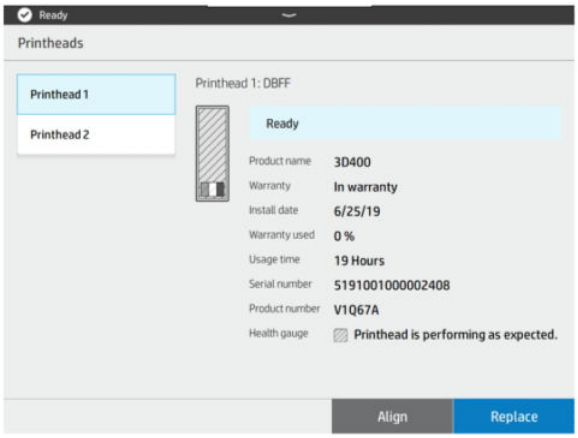
Printhead recovery routine

1. Before starting troubleshooting, inspect and clean the service station. Check the capping station rubber seals and use dampened lint free cloth to clean any liquids or material from the caps.
2. Check the cleaning roll and make sure it is not near empty. Replace the cleaning roll if it's near empty.
3. In order to make sure the cleaning roll works properly, from the Maintenance menu, run **Service assist** > **6.0 Service Station** > **6.1 Service Station Test**. Confirm that the test passes. If any error codes are reported, troubleshoot those errors before continuing with your print quality troubleshooting.
4. Run **Maintenance** > **Part troubleshooting** > **Printhead Recovery 1**. Then, print the Diagnostic Page again for before and after comparison.
5. If printhead quality is still not good enough, run **Printhead Recovery 2** from the same menu.



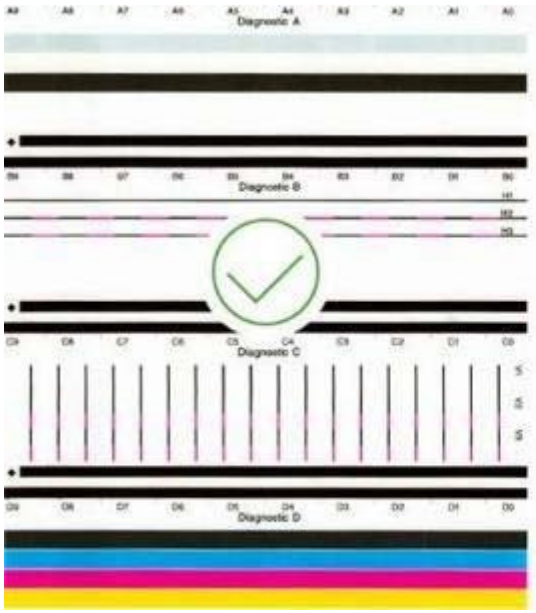
Printhead alignment

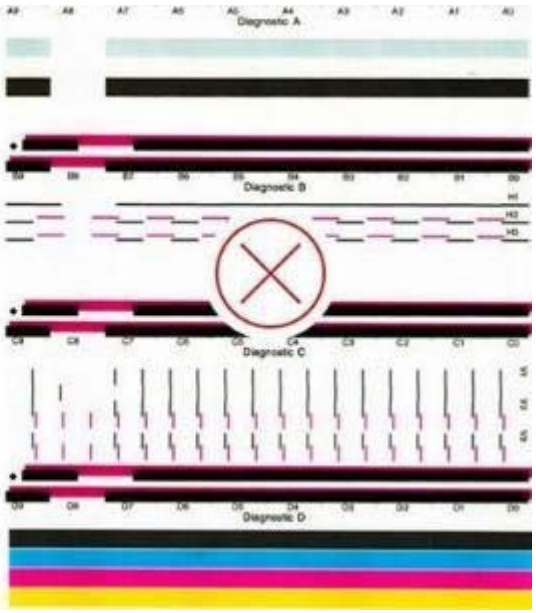
1. You can run a printhead alignment from **Maintenance** > **Printheads** > **Align**.



2. If you are troubleshooting 2D print quality while doing a printhead alignment, do not use the first printed Diagnostic Page from the Alignment flow: always use the second Diagnostic Page printed. The first Diagnostic Page is for reference before alignment only.

3. Print another Diagnostic Page after performing any of the recommended actions and use the two test pages to compare before and after results.





Printhead alignment issues

- Alignment issues. If you notice alignment issues, you can print the quality diagnostic plot under **Maintenance** menu > **Part troubleshooting** > **Print quality diagnostic** to check the status of the printhead alignment. See Align the printheads on page 167.
- The front panel may display a system error while aligning the printheads. See System errors on page 178.

Scan issues related to media type

Most of the time, the 2nd, or 3rd page (yellow, Bright-fusing) are too light for the scanner to recognize and rejects the paper. In general, the issues with scanner is when the sensor fails/electrical errors.

Recommendations:

1. Check the quality of the paper.
2. Check the ink on the paper. If you see many nozzles out > Run printhead diagnostics.
3. Cleaning the scanner sensor helps in some cases.
4. If both printheads are fine, try to scan several times, so the machine “skips” that paper. Firmware retrieves related information from the last performed printhead alignment.

How to get the diagnostic package

If you need the help of HP support, you may need to send the diagnostic package by email. There are two ways to get the diagnostic package.

NOTE: Try to avoid downloading the diagnostic package while the printer is working, which could cause printing failures.

With a USB flash drive

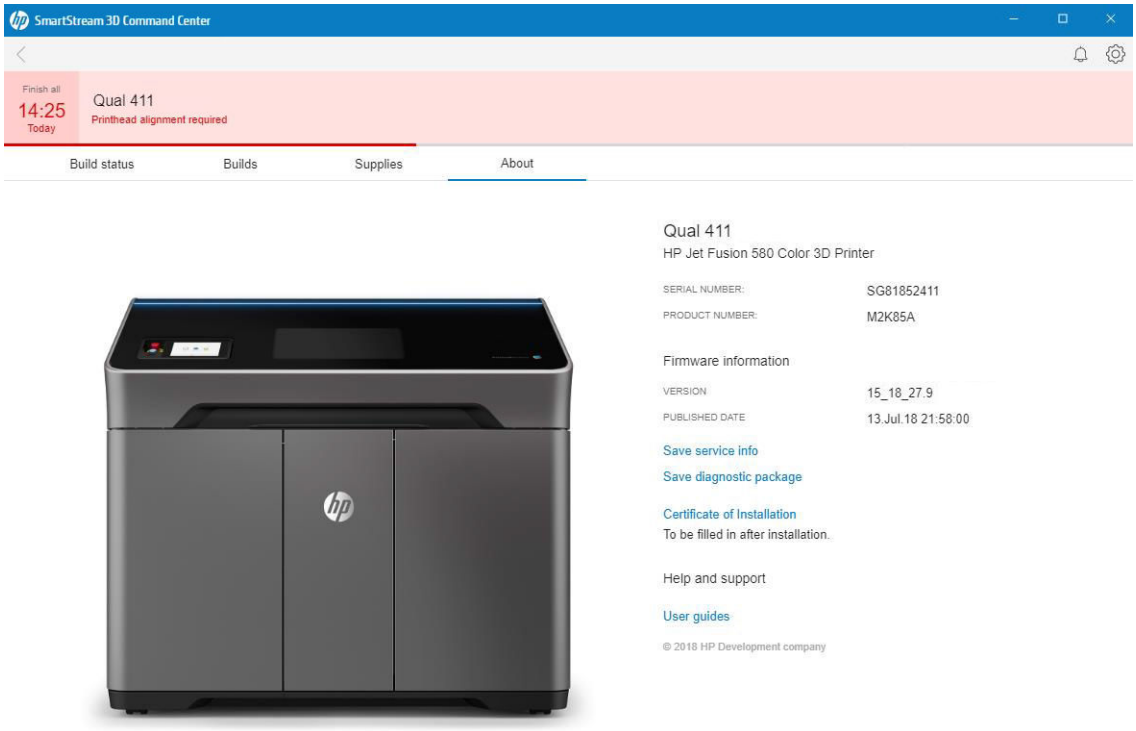
1. Restart or rearm the printer to confirm the problem.
2. Collect the printer logs and escalate the problem for troubleshooting assistance. Also collect general information about what the printer was doing at the time when the problem occurred.
3. Prepare a USB flash drive, freshly formatted as FAT32, with a file named **pdipu_enable.log** in the root folder (or with the name provided by the HP support remote engineer). Ensure that the flash drive has a storage capacity of more than 4 GB and less than 32 GB.
4. Plug the flash drive into the USB port behind the front panel. The printer logs should then be automatically stored on the flash drive.

   NOTE: These files are encrypted; they may be needed for problem analysis.

5. Escalate this problem to Level 2 for advanced troubleshooting assistance.

Through the Command Center

1. Open Command Center.
2. Click **Save diagnostic package**.



Water tank refill too slow troubleshooting

The following steps provide the complete procedure for this topic.

1. If the filter appears clogged or flows very slowly, remove it by pinching the front and back faces.

2. Clean the filter by using a soft brush and warm soapy water on both the inside and the outside. Make sure to rinse it well before placing it back in the printer. You can use tap water to clean and rinse the filter.

3. Snap it back in place.

15 Maintenance

⚠ **WARNING!** Hardware maintenance may be performed by trained personnel only. During printer installation, the designated personnel receive training for safe operation and maintenance of the printer. No-one should use the printer without this training.

Safety precautions

Read and follow the safety precautions in this guide to make sure you use the printer safely.

Safety precautions on page 4

You are expected to have the appropriate technical training and experience necessary to be aware of hazards to which you may be exposed in performing a task, and to take appropriate measures to minimize the risks to yourself and to others.

General cleaning instructions

For general cleaning, a lint-free cloth dampened with distilled water is recommended. Let it dry or use a piece of cloth to dry the cleaned part completely.

Do not spray fluids directly on the HP product. Spray the fluid on the cloth used for cleaning.

To remove stubborn dirt or stains, moisten a soft cloth with water and a neutral detergent, or general-purpose industrial cleaner (e.g. Simple Green industrial cleaner). Remove any remaining soap foam with a dry cloth.

For glass surfaces, is recommended to use a soft, lint-free cloth lightly moistened with a non-abrasive glass cleaner or with general purpose glass cleaner (e.g. Simple green glass cleaner). Remove any remaining soap foam with a lint-free cloth dampened distilled water and dry it with a dry cloth to prevent spotting.

⚠ **CAUTION:** Do not use abrasives, acetone, benzene, sodium hydroxide or carbon tetrachloride on the glass; they can damage it. Do not place or spray liquid directly on the glass, the liquid might seep under the glass and damage the device.

It is recommended to use a canister of compressed air to remove dust from electronic/electrical parts.

⚠ **CAUTION:** Do not use water-based cleaners for parts with electrical contacts; it may damage electrical circuits.

NOTE: Do not use wax, alcohol, benzene, thinner, ammonia-based cleaners or any other chemical detergents when cleaning, in order to prevent damage to the product or the environment.

NOTE: In some locations, the use of cleaning products is regulated. Ensure that your cleaner follows federal, state, and local regulations.

Maintenance resources

Maintenance kits

Table 15-1 Maintenance kits

Name	Purpose	How to order
Printer initial maintenance kit	For periodic maintenance operations that require the replacement of printer parts	Contact your HP-authorized reseller
Other maintenance kits	For periodic maintenance operations of various kinds	Contact your HP-authorized reseller

Kit contents

NOTE: The contents of each kit may vary.

Printer initial maintenance kit contents

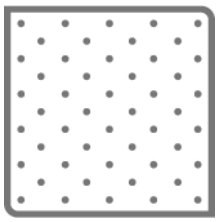
HP recommends purchasing this kit with your printer.

Table 15-2 Printer initial maintenance kit

Part	Part numbers	Quantity	Purpose
Air intake filter	8WA27A	1	Replace the air intake filter on page 163
Print-area filter	8WA28A	1	Replace the print-area filter on page 160
Air exhaust filter	8WA29A	2	Vacuum the air exhaust filter compartment on page 128
Printhead cleaning roll	8WA30A	2	Replace the cleaning roll on page 141
Lamp module	230U6A	1	Replace a fusing lamp on page 137

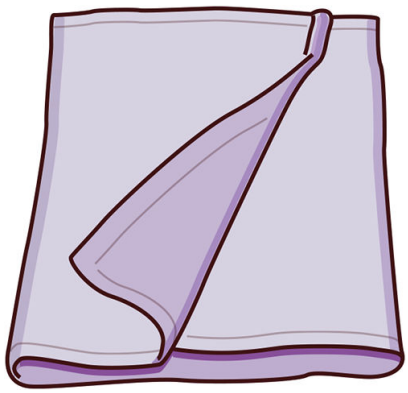
Maintenance tools recommended but not provided

- Disposable antistatic alcohol wipes



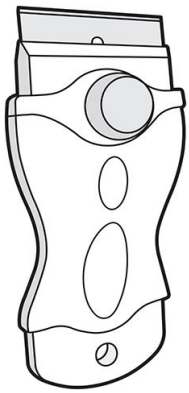
- Disposable lint-free wipes

- Lint-free cloth

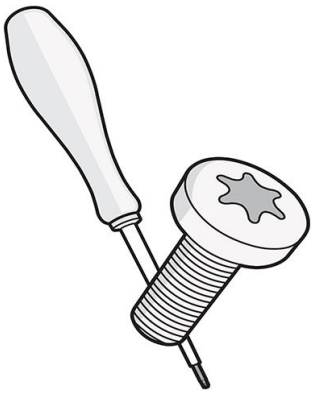


- Distilled water

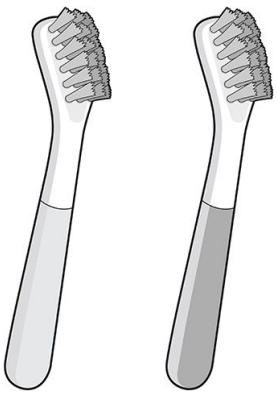
- Razor scraper



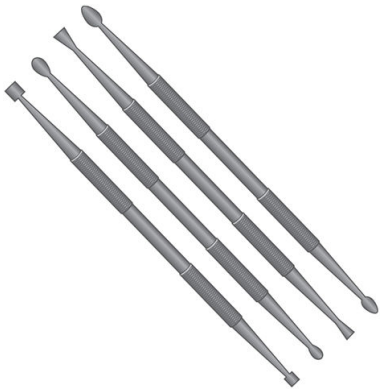
- T20 screwdriver



- Soft brushes

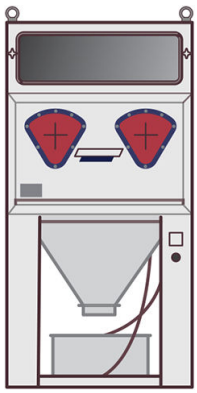


- Metal picks for cleaning detailed parts

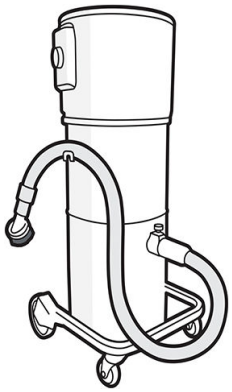


- Part cleaning basket for bead and air blasting small parts

- Bead and air blaster



- Explosion-protected vacuum cleaner, with nozzle accessories for general cleaning (large and small soft-brush nozzles highly recommended)



NOTE: Inside and outside the equipment should be cleaned regularly with an explosion-protected vacuum cleaner to prevent dust from accumulating. Do not sweep the dust or try to remove it with a compressed-air gun.

An explosion-protected vacuum cleaner certified for collection of combustible dust is required for cleaning. Take measures to mitigate material spillage and avoid potential ignition sources such as ESD (ElectroStatic Discharges), flames, and sparks. Do not smoke nearby.

Printer maintenance schedule

Fixed-interval cleaning operations

Table 15-3 Operations

Frequency	Maintenance operation	Part description	Part number	Time
After every job	Clean after each job using general cleaning instructions.			
	Clean the print area on page 114			
	Wipe the recoating roller on page 118			
	Scrape and wipe the fusing lamp on page 124			
	Vacuum the air exhaust filter compartment on page 128			
After every 30 jobs	Vacuum the material reclamation sieve drawer on page 131			
	Check the Perimeter Vacuum Ports on page 112 (Model A with Serial Numbers starting with SG8 or SG9 and without tag matrix #9 marked only)			
When needed	Clean the inside of the viewing window (500 series only) on page 133			
	Clean the build-chamber front rail on page 134			
	Clean the scanner on page 134			
	Replace a fusing lamp on page 137	HP 3D 500/300 Series 2nd Gen Lamp Module	230U6A	15 min
	Add or remove material (see Material on page 51)			
	Replace agents (see Agents on page 48)			

Table 15-3 Operations (continued)

Frequency	Maintenance operation	Part description	Part number	Time
	Refill water tank (see Distilled or deionized water on page 55)			
When needed	Clean the caps on the capping assembly. on page 57			
	Replace the Ribbon spreader box (340: M2K87-67009 / 540 & 580: M2K85-67040) on page 58	Ribbon carriage box assembly	M2K85-67040	
	Replace the Build platform (340: M2K87-67002 / 540 & 580: M2K85-67025) on page 62	Build Platform Assembly	M2K85-67025	
	Replace the Printhead cap assembly (M2K85-67061) on page 63	Printhead Capping	M2K85-67061	
	Replace the Carriage front bearings (M2K85-67116) on page 64	Carriage Front Bearings	M2K85-67116	
	Replace the Printing Carriage carriage-cover (M2K85-67290) on page 70	Printing Carriage Cover	M2K85-67290	
	Replace the MRS Intermediate Tank (M2K85-67320) on page 72	Material Reclamation System Intermediate Tank Assembly	M2K85-67320	
	Replace the Carriage front bearing brushes (M2K85-67364) on page 66	Carriage Front Bearing-Brushes	M2K85-67364	
	Replace the Lower trim grommets replacement (M2K82-67414) on page 67	Lower Trims Grommets	M2K82-67414	

Usage-based maintenance operations

Table 15-4 Maintenance operations

Frequency	Maintenance operation	Part description	Part numbers	Time
Once every 30 Jobs	Check the Perimeter Vacuum Ports on page 112 Model A with Serial Numbers starting with SG8 or SG9 and without tag matrix #9 marked only.	Perimeter vacuum port cleaning tool (except the rear perimeter port, which can only be done by a field Service Engineer)	M2K85-67343	5 min
Once every 2 months	Replace the cleaning roll on page 141	Printhead cleaning roll	8WA30A	5 min
Once every 3–5 months	Replace the material reclamation filter on page 146	Air-exhaust filter	8WA29A	5 min
Once every 3–7 months	Replace the air exhaust filter on page 149	Air-exhaust filter	8WA29A	5 min
	Replace a printhead on page 152	HP 3D400 Printhead Kit	V1Q67A	90 min
		HP 3D450 Color Printhead Kit	V1Q76A	
	Replace the print-area filter on page 160	Print-area filter	8WA28A	5 min
Once every year	Replace the air intake filter on page 163	Air-intake filter	8WA27A	5 min
Once every 5 years	Replace the printhead cap on page 166	Printhead cap		2 min

Check the Perimeter Vacuum Ports

Always perform the steps of this procedure in the order presented..

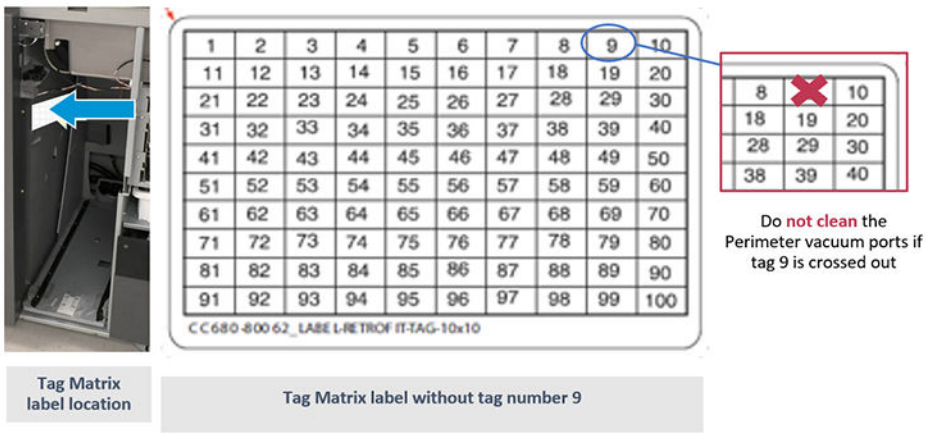
Tools needed

- PVAC Cleaning tool
- Explosion-protected vacuum cleaner with a soft brush nozzle
- Nitrile gloves (required)
- Mask (recommended)
- Protective eyewear (recommended)

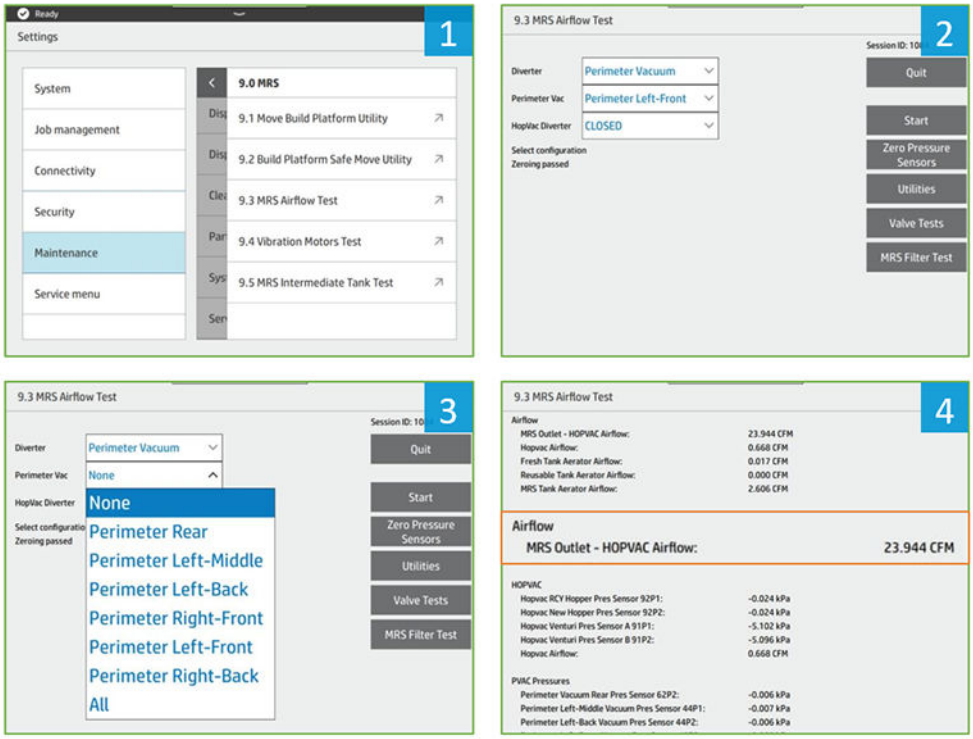
1. HP highly **recommends** checking the Perimeter vacuum ports every 30 jobs, and cleaning them if needed **for printers fulfilling all these conditions**:
   - Model A
   - Serial Number starting with SG8 or SG9
   - Without tag number 9 in the Tag Matrix label

IMPORTANT: Do not clean the Perimeter Vacuum Ports if your printer is a:

- Model B
- A model with other Serial Numbers or tag number 9 (see picture below).



2. Navigate to **Maintenance** > **Service Assist** > **9.0 MRS** > **9.3 MRS Airflow Test**.



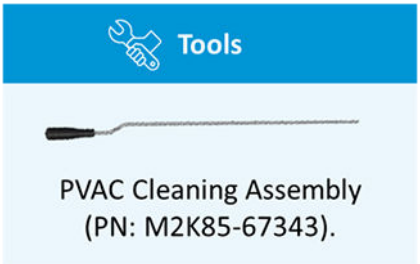
3. 3. Select from the drop-down list:
   - **Diverter field**: Perimeter Vacuum
   - **HopVac Diverter field**: Closed
4. Select a port starting with perimeter left-middle and click **Start**.

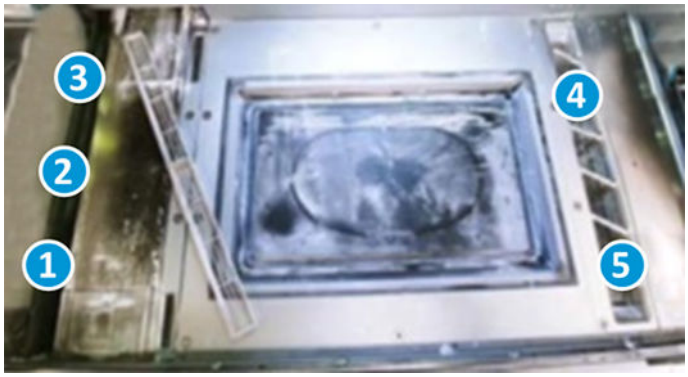
   If **MRS Outlet - HOPVAC Airflow value** is:

   a. **Above 23 CFM:** OK

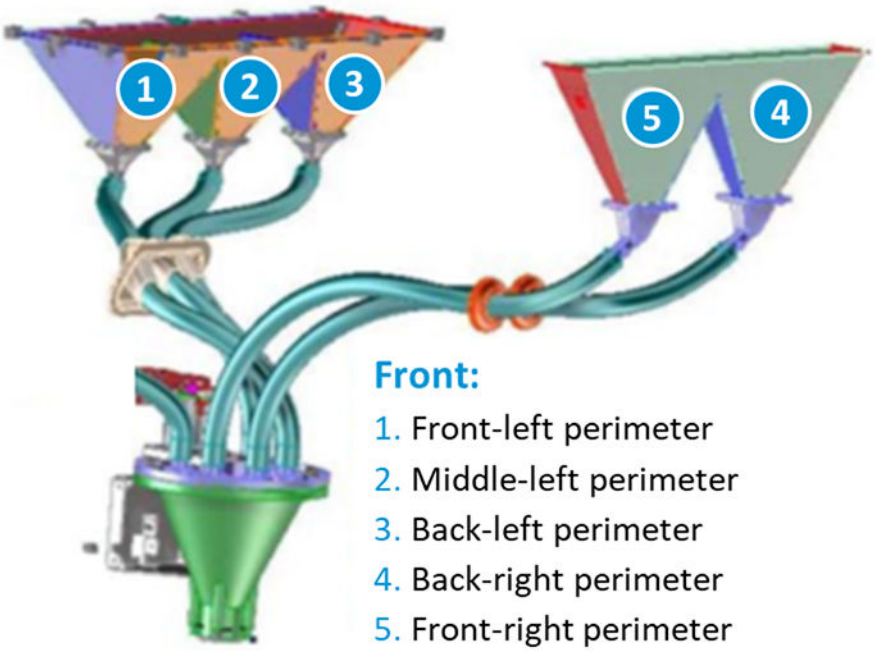
   b. **Between 21-23 CFM:** A cleaning of this port is recommended.

   c. **Lower than 21 CFM:** A cleaning of this port is needed.
5. Repeat steps 3-4 for every port, **except Perimeter Rear** , that can only be cleaned by a Field Service Engineer.
6. If cleaning is needed based on the results of Step 4, clean the PVAC ports as shown in the following pictures:





7. Front perimeter vacuum ports, for each one:
   a. Feed the cleaning tool **down** into the perimeter port approximately **10 in** (25 cm).
   b. Spin the tool as you pull it from the line. Some resistance is normal.
   c. Repeat steps a and b two more times.
8. Vacuum any loose powder using Explosion-protected vacuum cleaner with a soft brush nozzle.
9. Dispose of the contents of the vacuum cleaner according to local regulations.



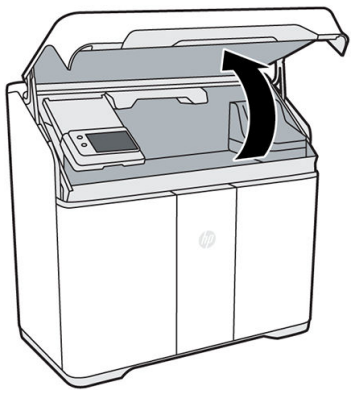
Clean the print area

Tools needed

- Explosion-protected vacuum cleaner with a soft brush nozzle
- Nitrile gloves (required)
- Mask (recommended)
- Protective eyewear (recommended)

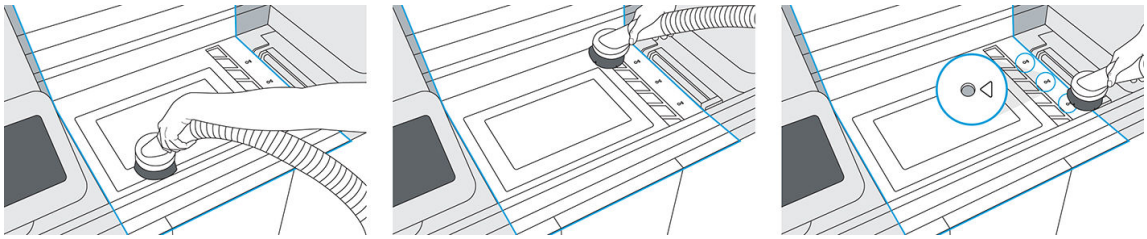
Procedure

1. Open the top cover.

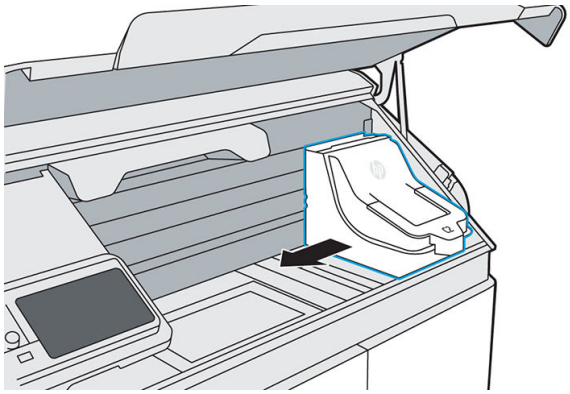


2. Use the explosion-protected vacuum cleaner with the soft brush nozzle to clean all exposed areas of the print area, build chamber, curtain, and optical sensors to the right of the build chamber.

⚠ **CAUTION:** Be careful when cleaning the curtain at the back of the print area: pressing too hard with the vacuum nozzle could damage the curtain.

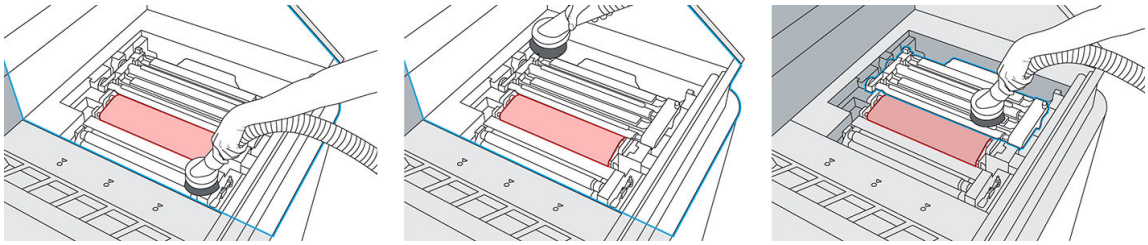


3. Move the print carriage over the center of the build chamber.

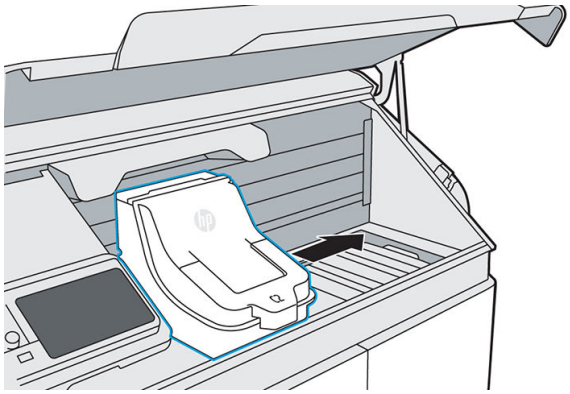


4. Vacuum all exposed surfaces in the print carriage area and the printhead cap.

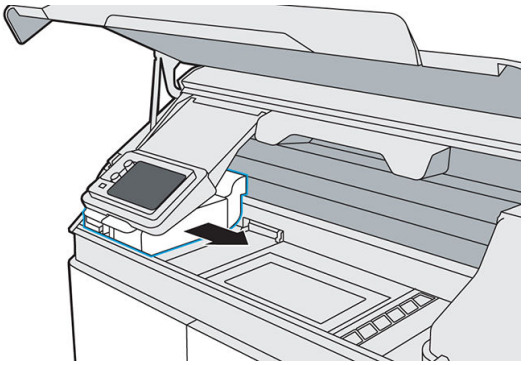
⚠ **CAUTION:** Do not vacuum or touch the printhead cleaning roll.

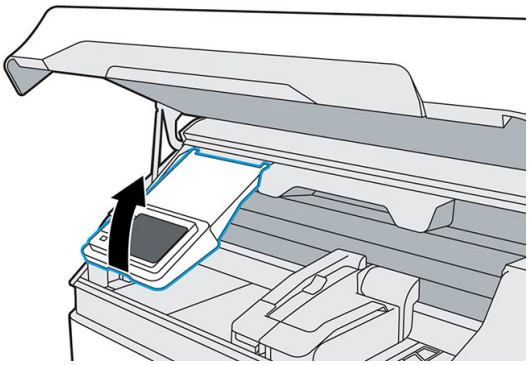


5. Move the print carriage back to its home position.

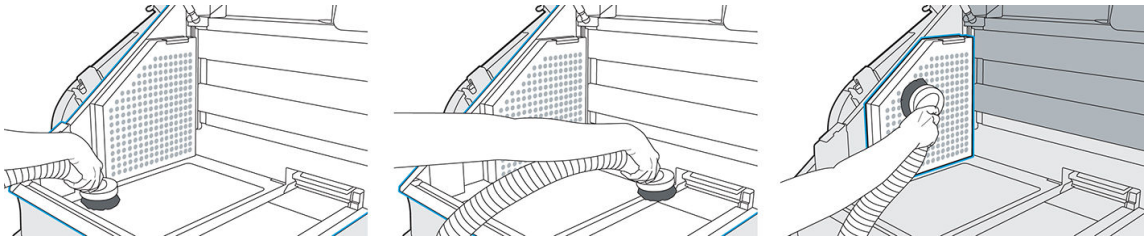


6. Move the fusing carriage to the right and lift up the front panel.

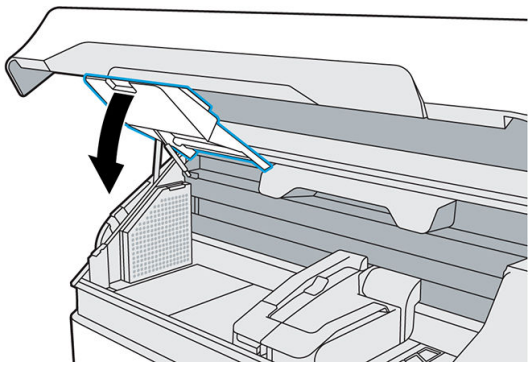


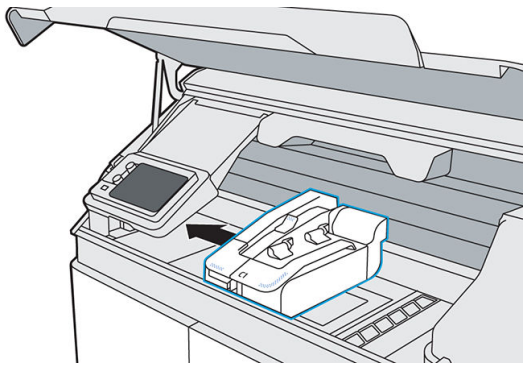


7. Vacuum all exposed surfaces, including the left wall and build-chamber filter cover.

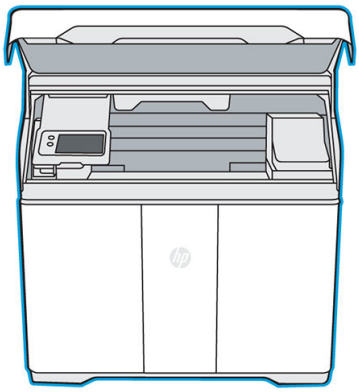


8. Lower the front panel, and move the fusing carriage back to its original position.



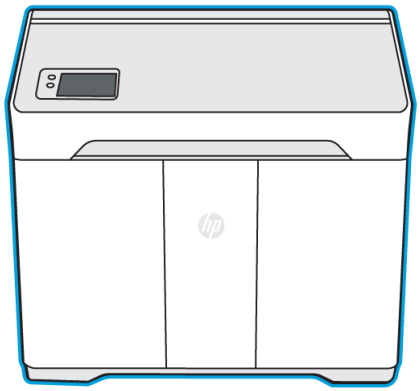


9. Vacuum the underside of the top cover.



10. 500 series only: If the window is not clean, wipe inside the window with an antistatic alcohol wipe.
11. Close the top cover.

12. Vacuum the exterior of the printer, including the areas around the front panel.



13. Dispose of the contents of the vacuum cleaner according to local regulations.

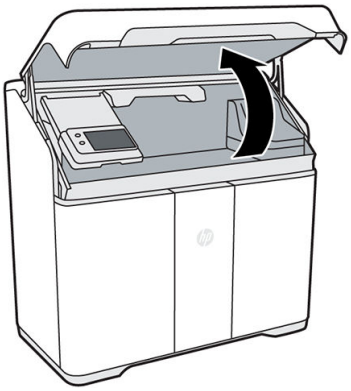
Wipe the recoating roller

You should wear gloves throughout this procedure to avoid contaminating the roller.

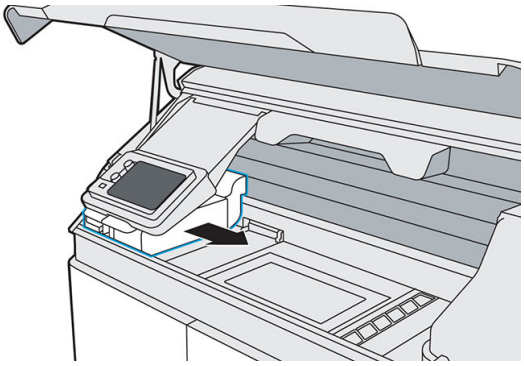
Tools needed

- Gloves
- Clean lint-free cloth
- Antistatic alcohol wipe

1. When prompted by the front panel, tap **Start**.
2. Open the top cover.



3. Move the fusing carriage to the center of the print area.



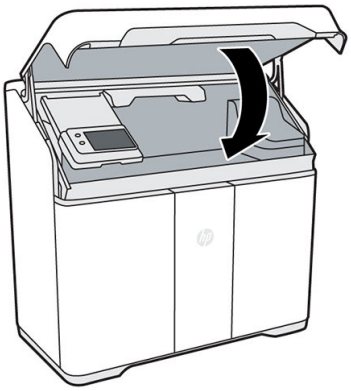
4. Locate the metal roller underneath the left side of the fusing carriage.
5. Clean the roller with a lint-free cloth.

NOTE: If the roller is contaminated with grease or oil, you may need to use an antistatic alcohol wipe.

6. Rotate the roller as you finish cleaning a section, to clean the entire roller.

CAUTION: Use gloves; do not touch the roller with your bare hands.

7. Close the top cover.

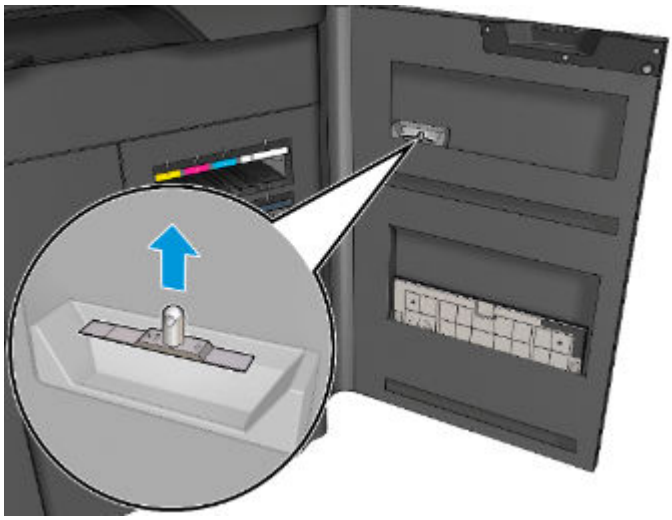


8. On the front panel, tap **Continue**, then **OK** to complete the process.

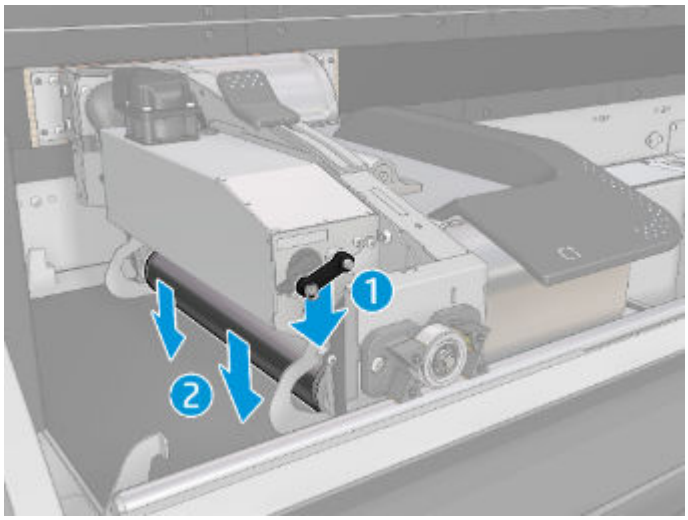
Verify the Ribbon carriage platform adjustment

Always perform the following steps in the order described.

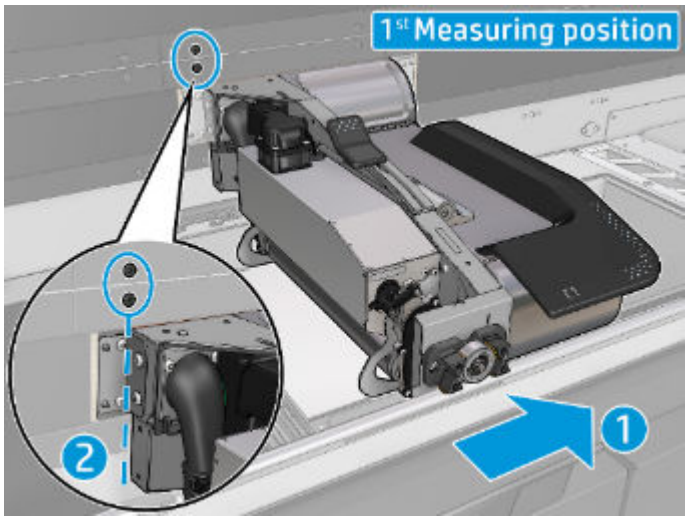
1. Locate the Ribbon carriage step gauge tool (PN: M2K85-67253) in the Agent door compartment.



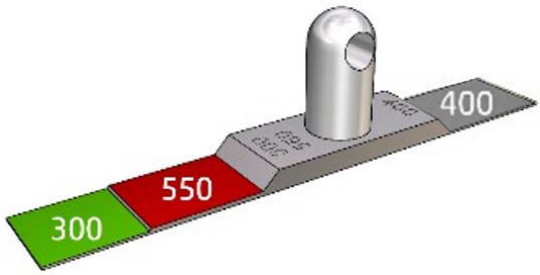
2. Bring the spreader roller to its lowest position by rotating the link at the front.



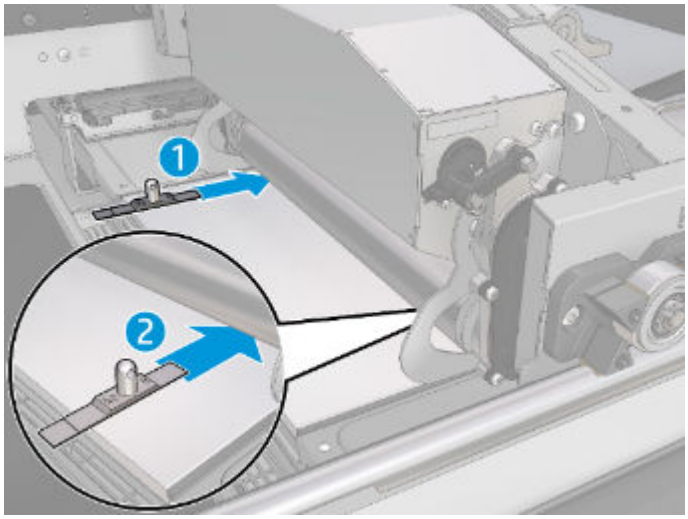
3. Move the Fusing carriage to the first measuring position. Align the left edge of the Recoating unit with the two screws in the curtain guides, as shown in the picture.



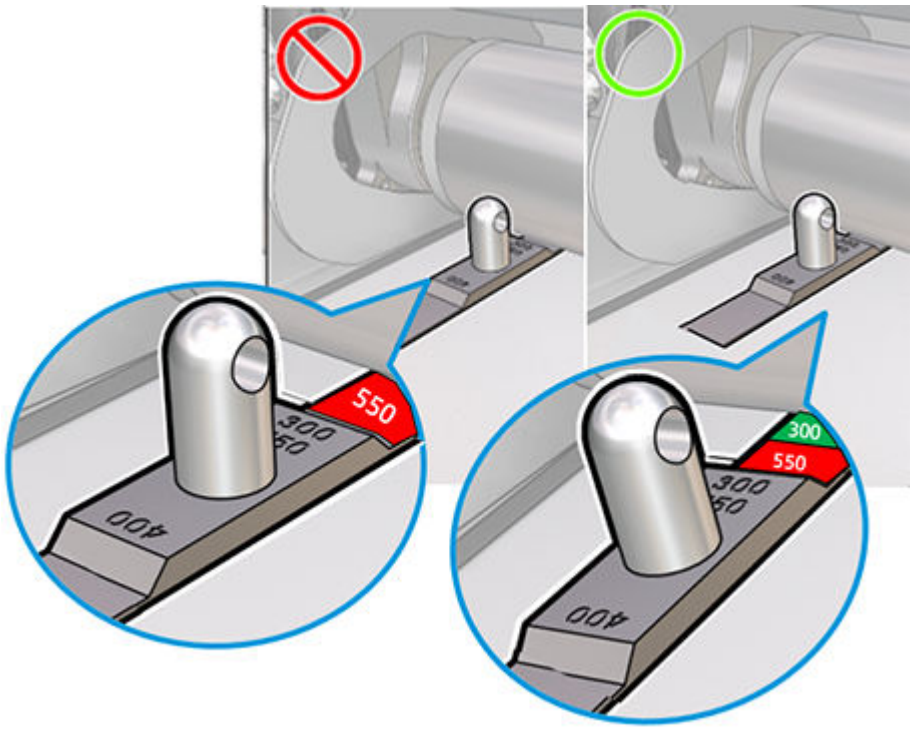
4. Use the Ribbon carriage step gauge go-no go verification tool to test that the height is within the 300 to 550. The other side of the tool is the nominal 400 for reference.



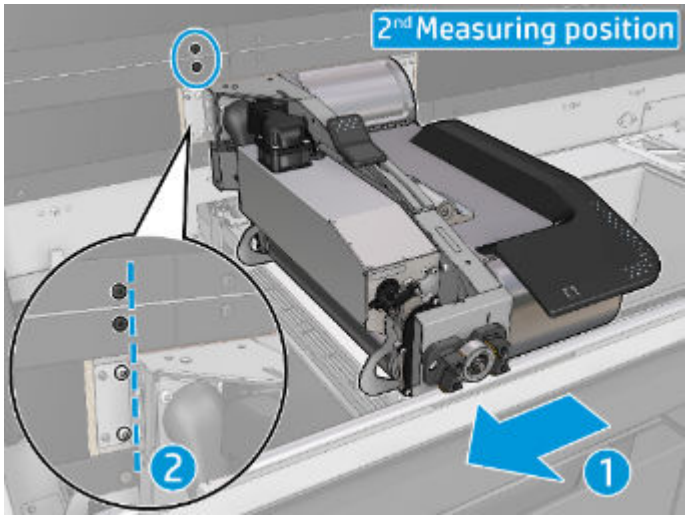
5. Start at the rear side of the Spreader roller, then at the front side.



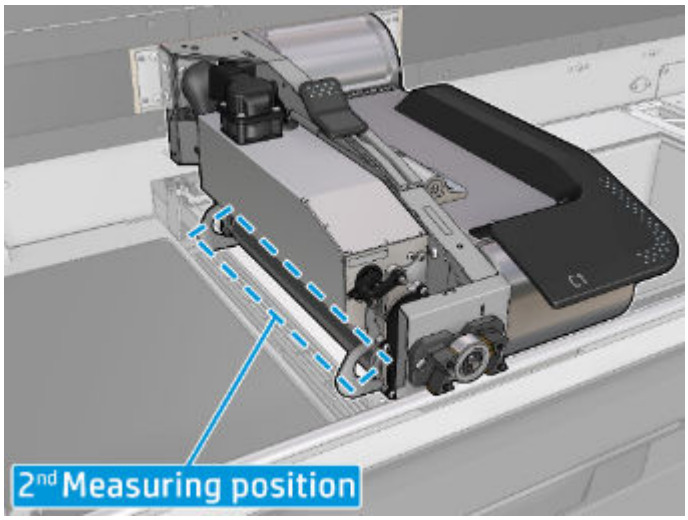
6. If the spacing is correct, the 300 will go under the Spreader roller but the 550 will not pass.



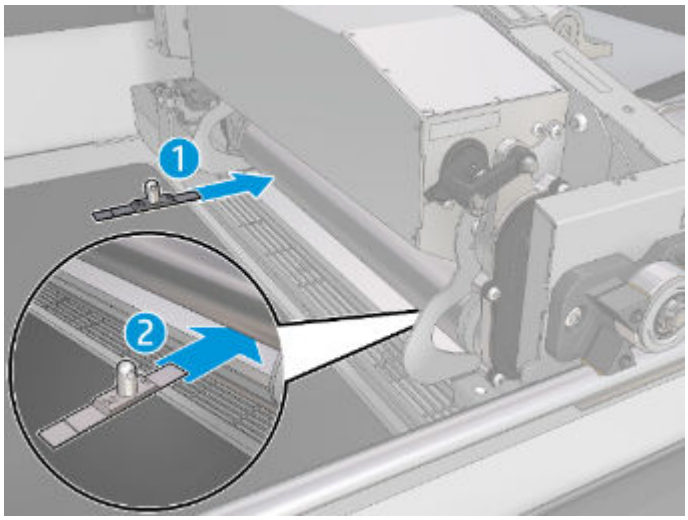
7. Move the Fusing carriage to the left and align the 2 screws in the curtain retaining guide with the screws in the fusing carriage curtain bracket as shown in the picture.



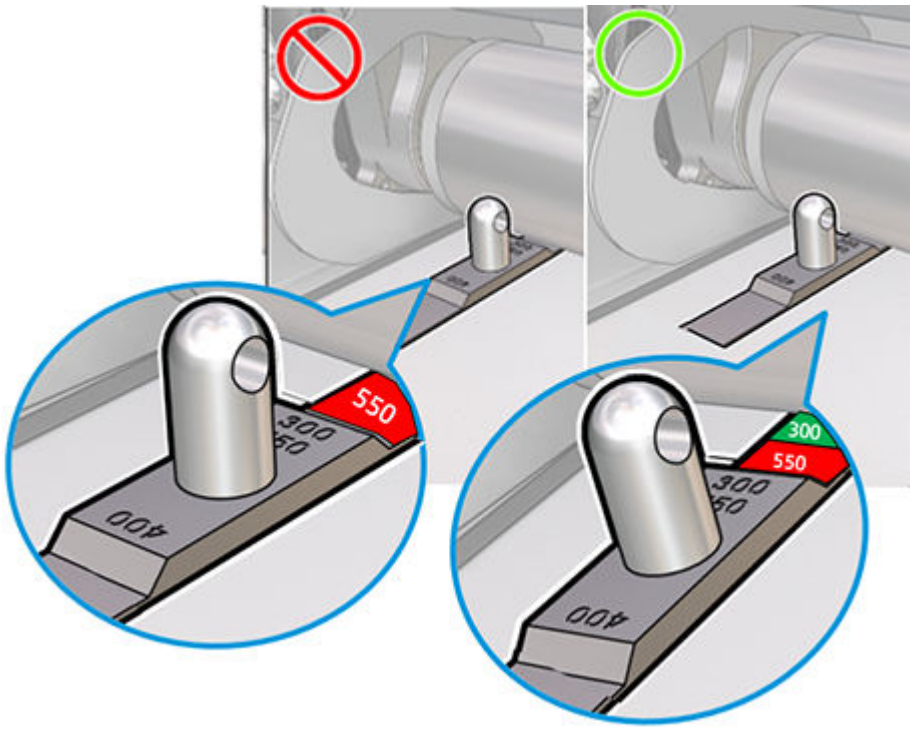
8. Use the go-no go verification tool to test that the height is within the desired range.



9. Continue at the rear side of the Spreader roller, then at front.



10. If the spacing is correct, the 300 will go under the Spreader roller but the 550 will not pass.



11. Manually slide the fusing carriage left and right across the Ribbon carriage area to ensure that there is no interference between the spreader roller and the ribbon carriage plate.

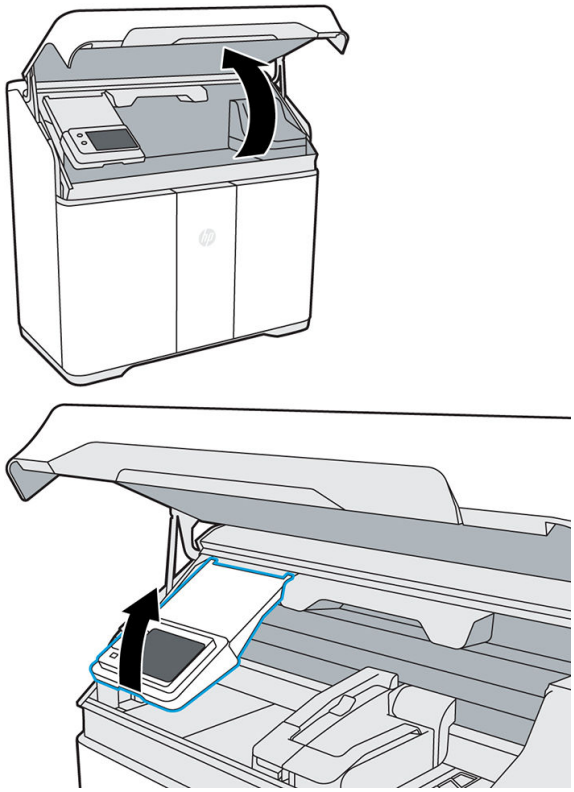
12. If any adjustment is needed, an FSE Technician would be required. For assistance, or any inspection guidance, contact the remote support engineer.

Scrape and wipe the fusing lamp

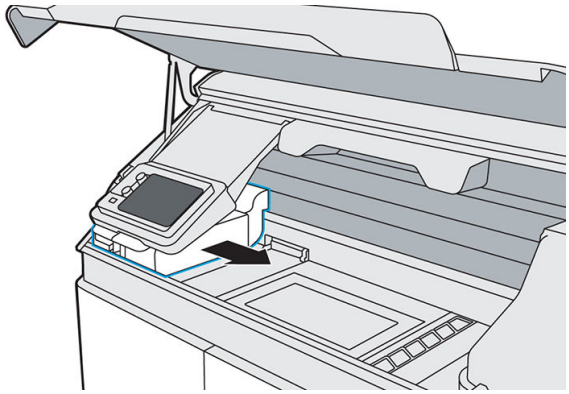
Tools needed

- Razor scraper
- Antistatic alcohol wipe
- Explosion-protected vacuum cleaner

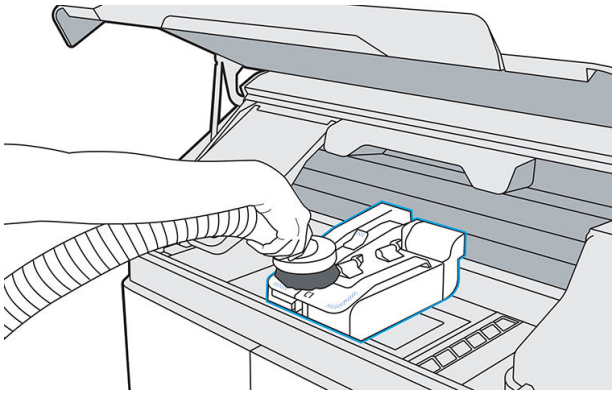
1. When prompted by the front panel, open the top cover. For better access, you can move the front-panel arm.



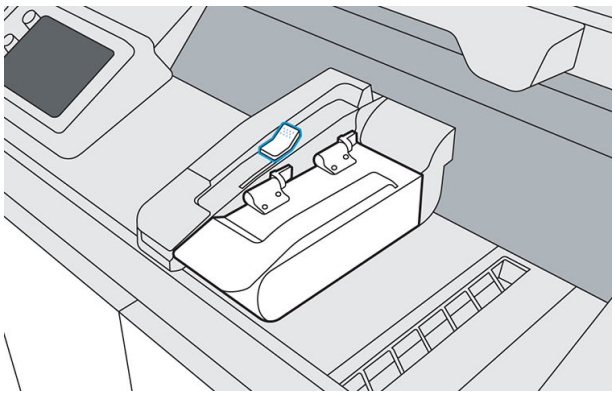
2. Pull the fusing carriage from the left of the build chamber to the center.



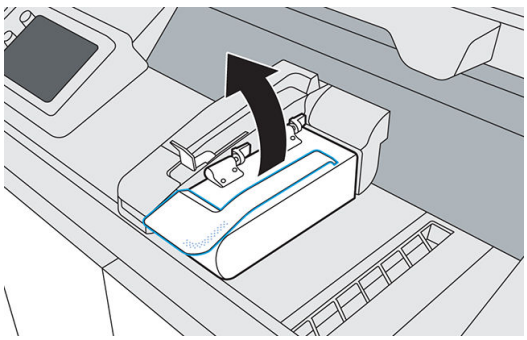
3. Inspect the top and sides of the fusing carriage. If you see any material there, use an explosion-protected vacuum cleaner to remove it.

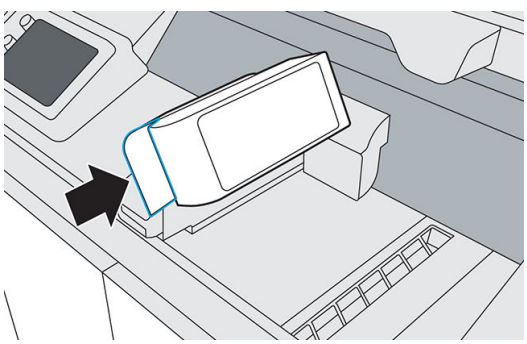


4. Pull the lamp release handle to disengage the lamp module from the printer.

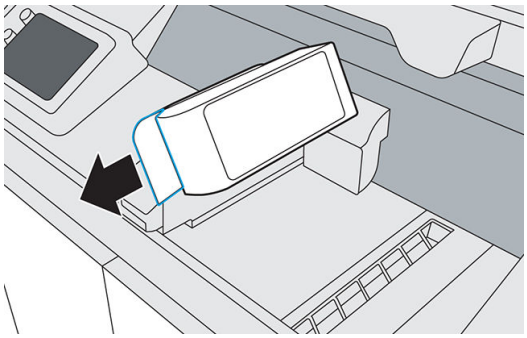


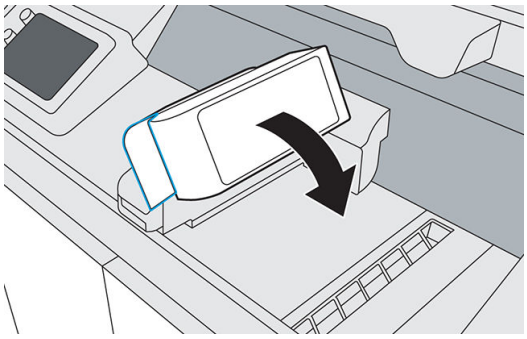
5. Lift the lamp handle and rotate the lamp to the left, then push to lock it into the cleaning position.



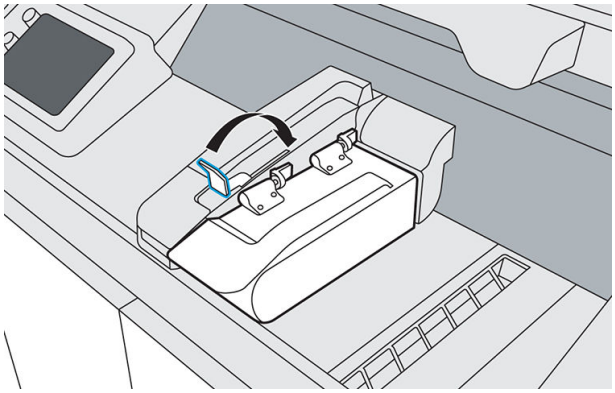


6. Use a glass scraper with a metal razor to scrape any fused material from the fusing lamp glass.
7. Use an antistatic alcohol wipe to finish cleaning the fusing lamp.
8. Pull the lamp to release it from its locked cleaning position, then rotate the lamp back to the right.

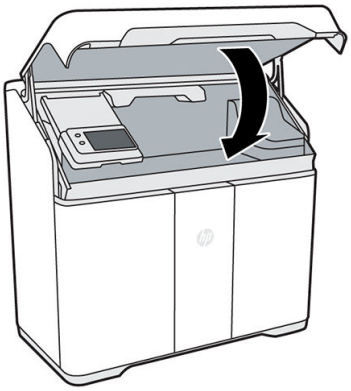




9. Push the lamp release handle back into place to connect the lamp module to the printer.



10. Close the top cover.



11. On the front panel, tap **Finish** to complete the process.

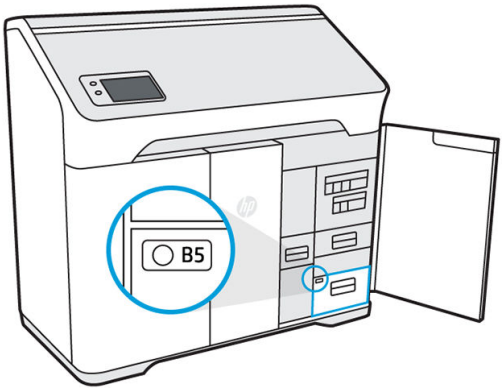
Vacuum the air exhaust filter compartment

Tools needed

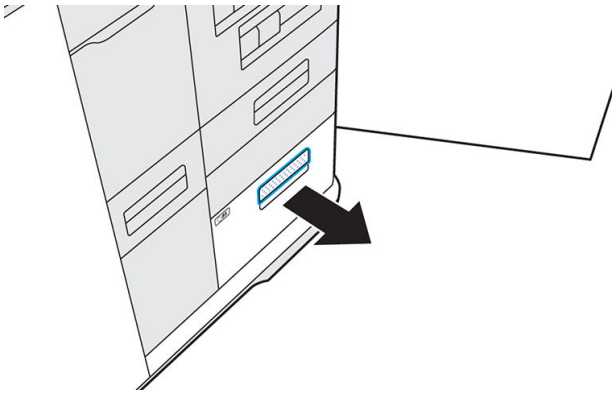
- Explosion-protected vacuum cleaner with a soft brush nozzle
- Nitrile gloves and mask (required)

Procedure

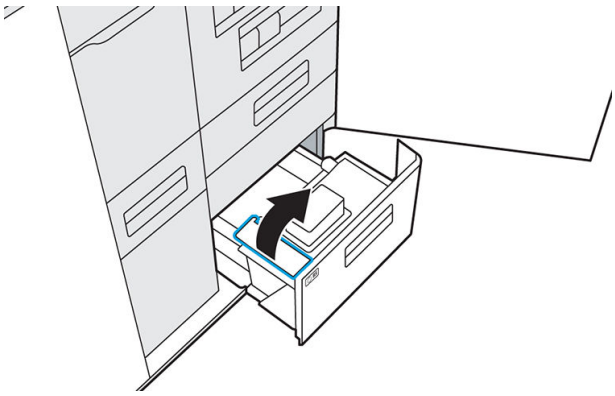
1. Open the agent door.



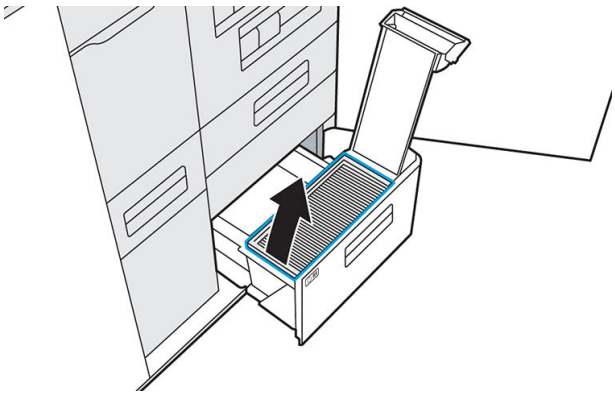
2. Open drawer B5 by pulling the handle.



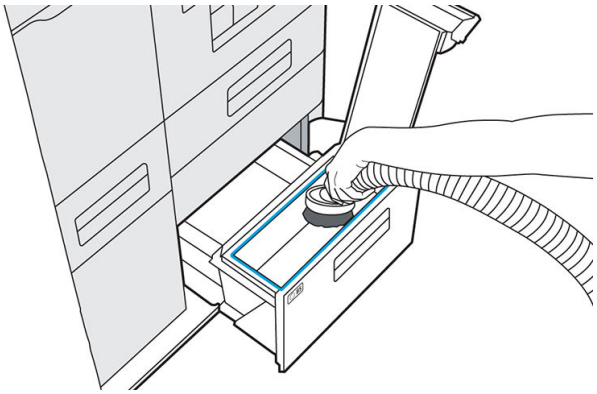
3. Unlatch and lift the lid to access the filter.



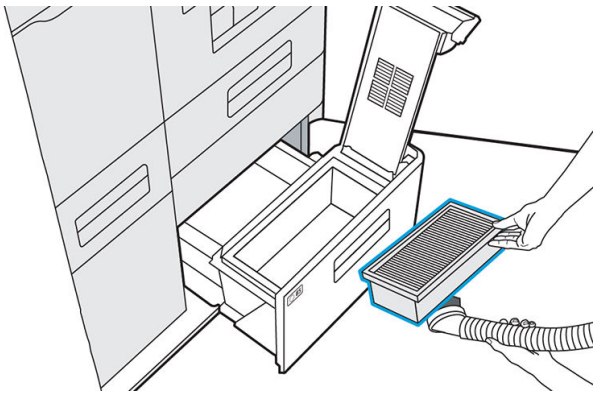
4. Remove the filter.



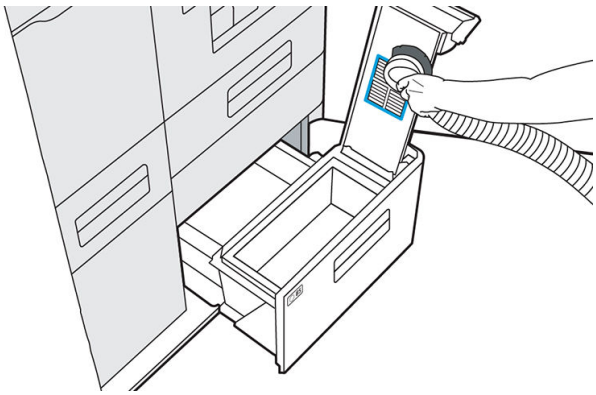
5. Vacuum any material in the compartment.



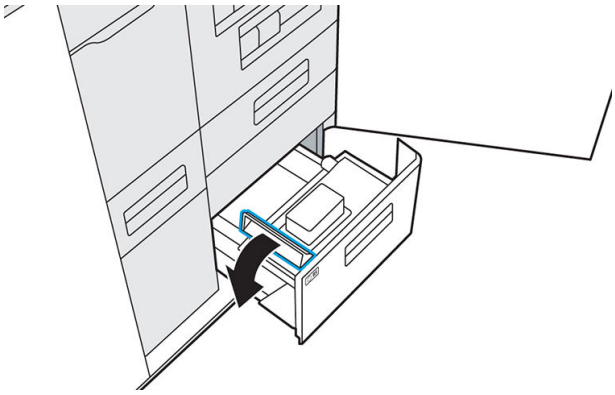
6. Vacuum any material from the bottom of the air exhaust filter.



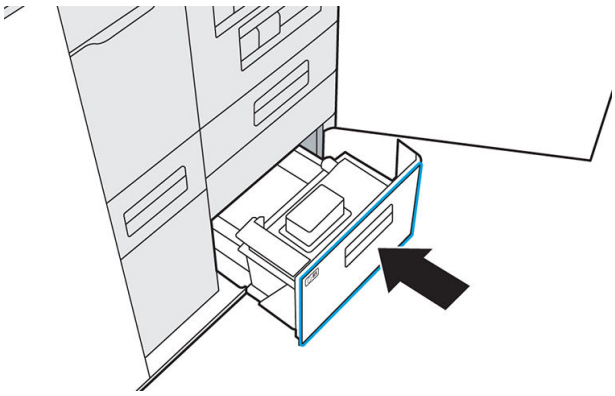
7. Vacuum the interior of the lid.



8. Push the handle down and make sure that the latch engages.



9. Push drawer B5 back in, and close the agent door.



10. Check that the LED has turned off.
11. Dispose of the contents of the vacuum cleaner according to local regulations.

Vacuum the material reclamation sieve drawer

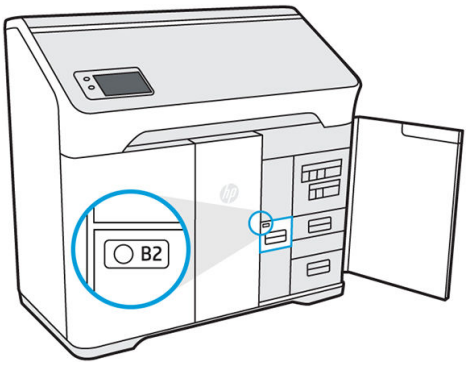
Tools needed

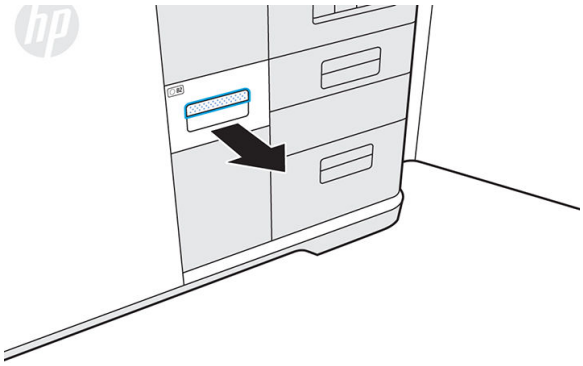
- Explosion-protected vacuum cleaner with a soft brush nozzle
- Nitrile gloves (required)
- Mask (recommended)

1. When prompted by the front panel, tap **Start**.

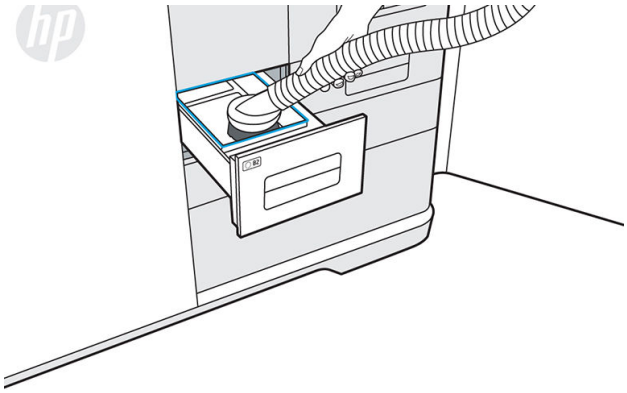
2. Open the agent door.

3. Open drawer B2 halfway, about 25 cm (10 in), by pulling the handle.

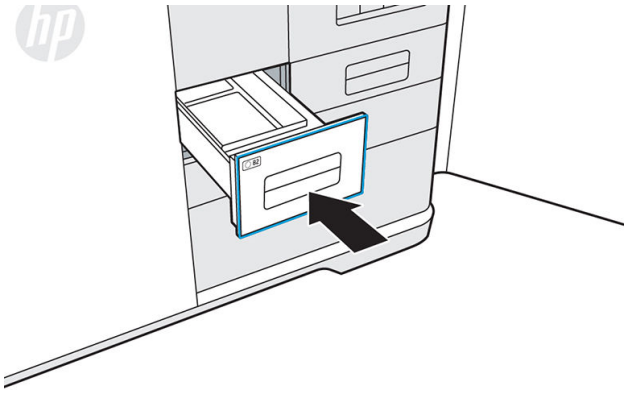




4. Turn on the explosion-protected vacuum cleaner, attach the soft brush nozzle, and vacuum the interior of the drawer.



5. When the drawer is clean, turn off the vacuum cleaner.
6. Close the drawer B2 firmly, then close the agent door.



7. Tap **Finish** and **OK** to complete the process.
8. Dispose of the contents of the vacuum cleaner according to local regulations.

Clean the inside of the viewing window (500 series only)

Tools needed

- Antistatic alcohol wipe or cloth dampened with alcohol
- Nitrile gloves (recommended)

▲ Wipe the inside of the window with an antistatic alcohol wipe, or with a cloth dampened with alcohol.

⚠ CAUTION: Do not use any spray alcohol or solvent in the build chamber.

⚠ CAUTION: Take care not to spill liquid on the equipment.

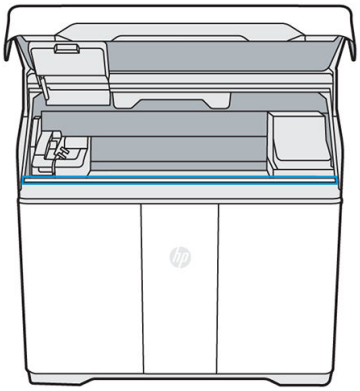
⚠ CAUTION: Ensure that the window is dry before using the printer.

Clean the build-chamber front rail

Tools needed

- Cloth dampened with water or alcohol

▲ Wipe the rail at the front of the build chamber with a dampened cloth to dislodge and clean any stains that have developed.



⚠ CAUTION: Ensure that the rail is completely dry before using the printer.

⚠ CAUTION: Do not use any spray alcohol or solvent in the build chamber.

Clean the scanner

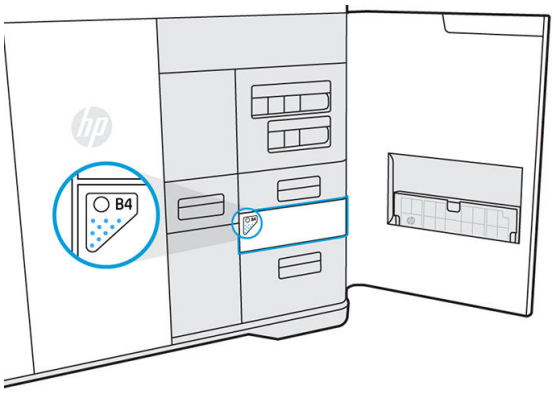
Tools needed

- Clean lint-free cloth
- Nitrile gloves (required)

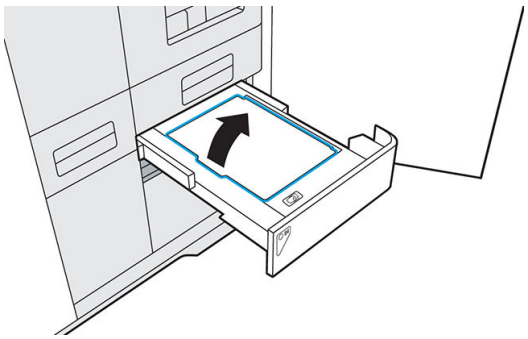
Procedure

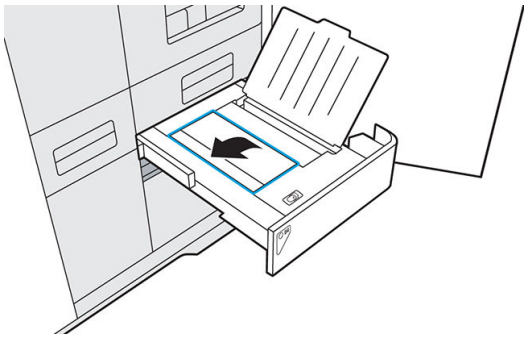
1. Open the agent door.

2. Push the scanner drawer (B4) to release and open it.

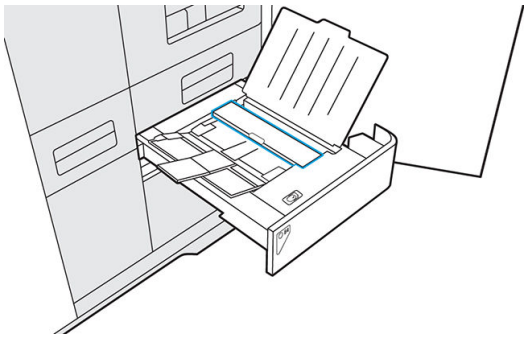


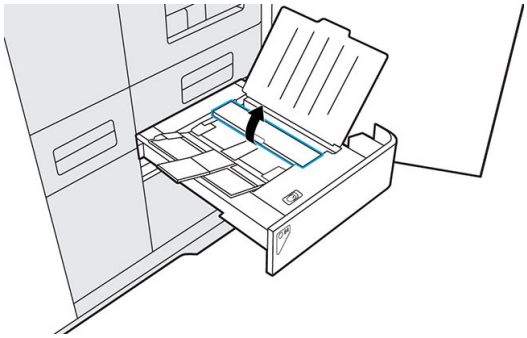
3. Open the scanner paper input and paper output trays.



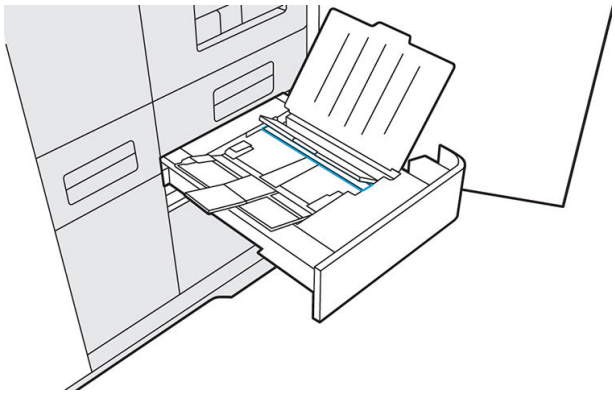


4. Rotate open the scanner access bar by reaching under the center tab and pulling up on the textured surface underneath.



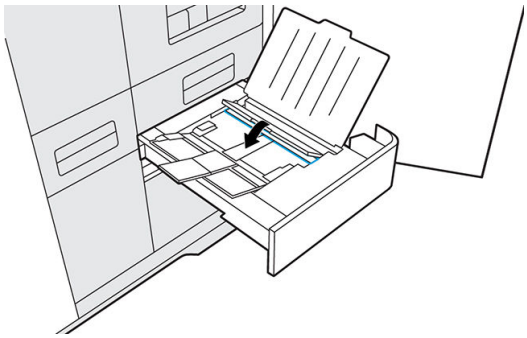


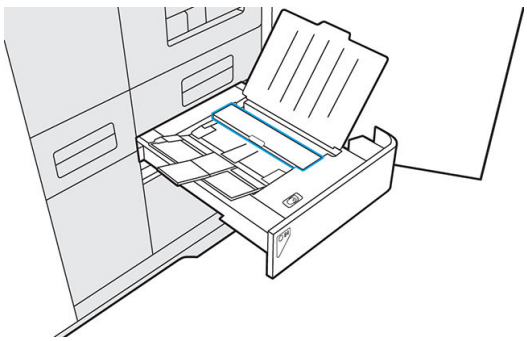
5. Locate the white plastic strip and the scanner glass strip. The glass strip is located underneath the scanner access bar on the base of the scanner, between the rollers and the white plastic strip.



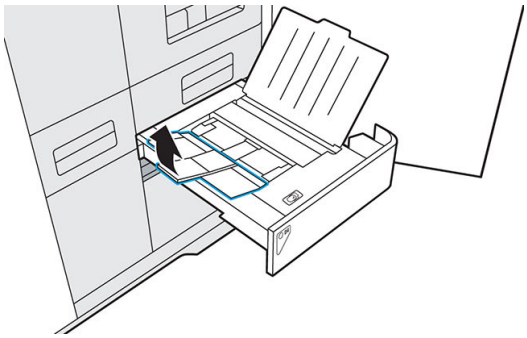
6. While holding the scanner access bar open, use a clean, lint-free cloth to press down firmly and wipe both the white plastic strip and the scanner glass strip. Make sure to break up any residue.

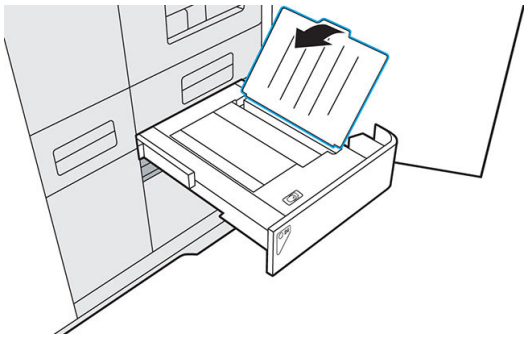
7. Lower and push the scanner access bar to close it.



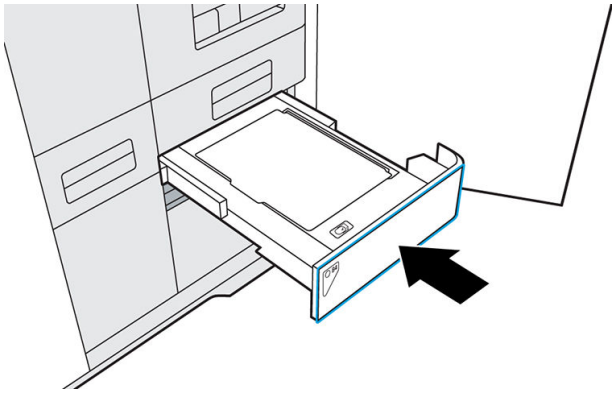


8. Close both paper trays.





9. Push the scanner drawer to close it.



10. Close the agent door.

Replace a fusing lamp

The front panel will tell you when a lamp needs to be replaced.

Tools needed

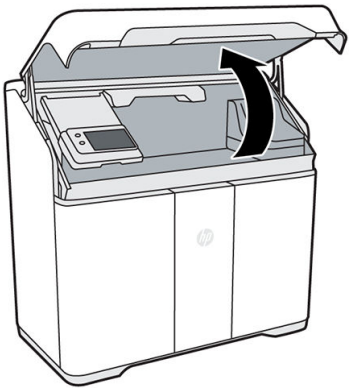
- SKU 230U6A - Lamp Module
- T20 screwdriver

- Nitrile gloves (required)

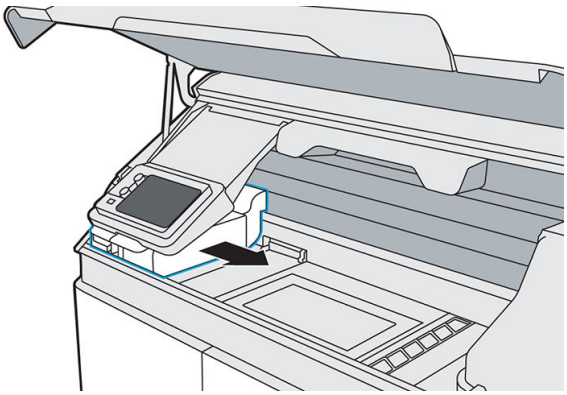
NOTE: If you receive an **Incompatible lamp error**, contact your service representative to order the latest version.

Procedure

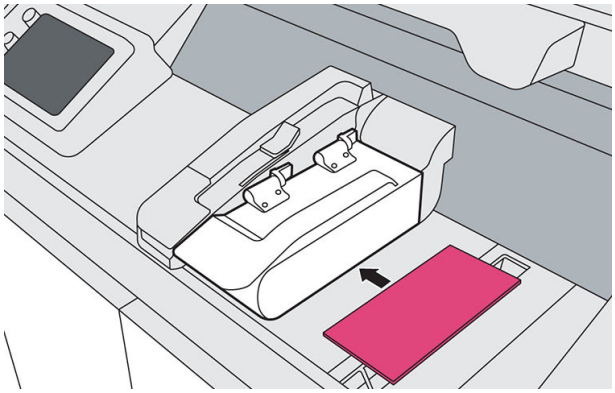
1. At the front panel, go to the **Supplies** tab, select the lamp, and tap **Replace**. The front panel displays a guide to the replacement process.
2. Open the top cover.



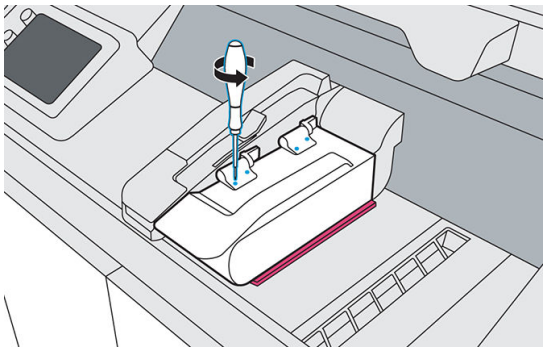
3. Move the fusing carriage (C1) to the center of the print area. If any material is present on the fusing carriage, vacuum it before proceeding.

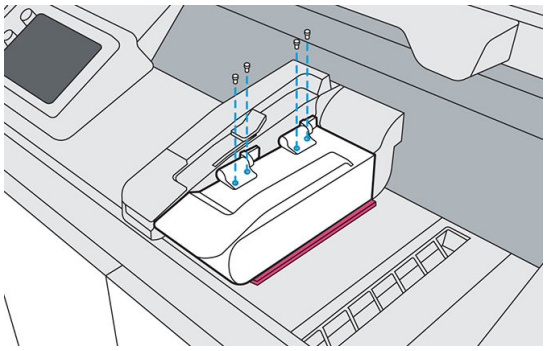


4. Remove the foam from the box and place it under the lamp.

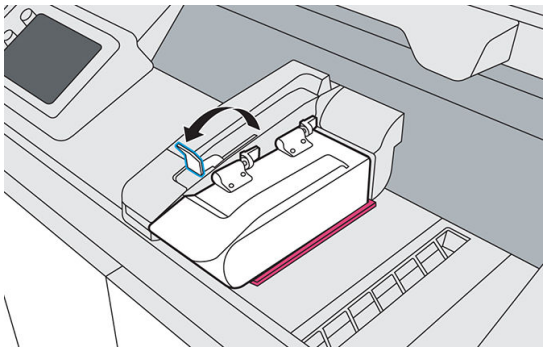


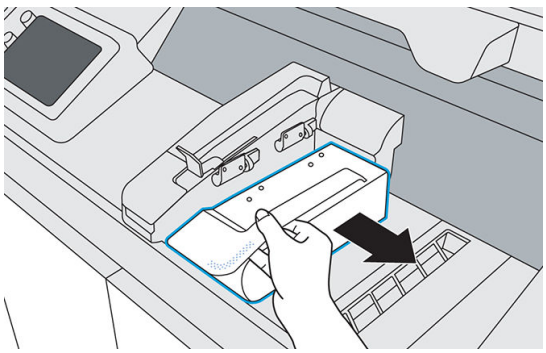
5. Use a T20 screwdriver to remove the four screws securing the lamp hinge to the lamp module.





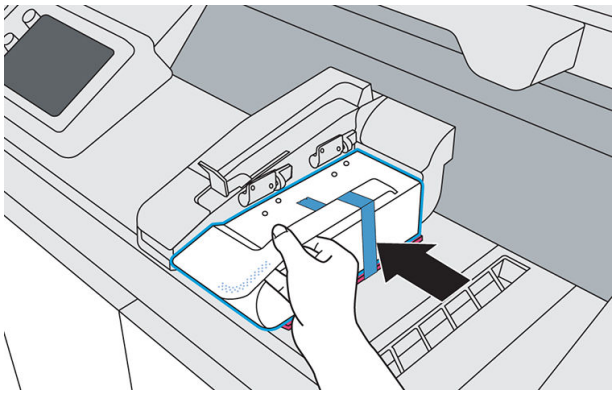
6. Pull the lamp release handle, lift the module, then remove it from the printer. Used lamps can be recycled through HP's Planet Partners Program, where available. Visit http://www.hp.com/recycle/ for more information. Where the program is not available, dispose of the lamp according to local regulations.



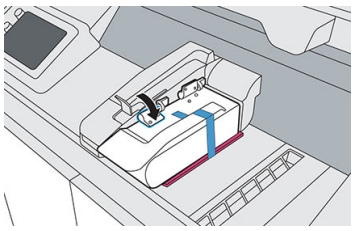


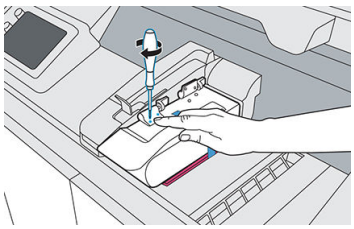
7. Take the new lamp from its packaging. Do not remove the tape and foam yet.

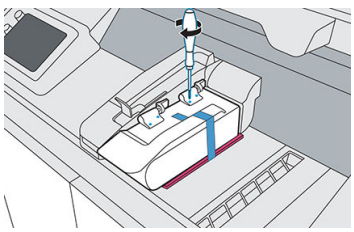
8. Holding the new lamp module, align it with the hinges on the fusing carriage.



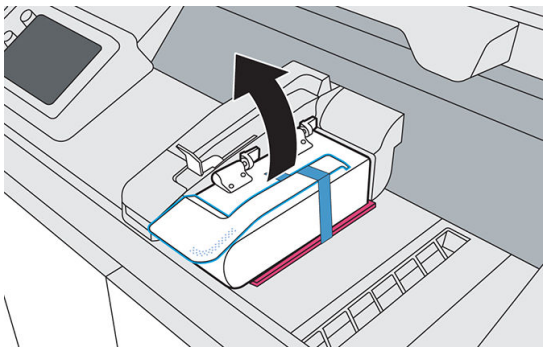
9. Holding each hinge in place, use a T20 screwdriver to replace all four screws.

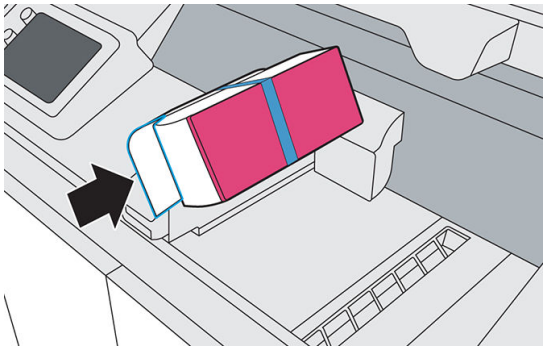




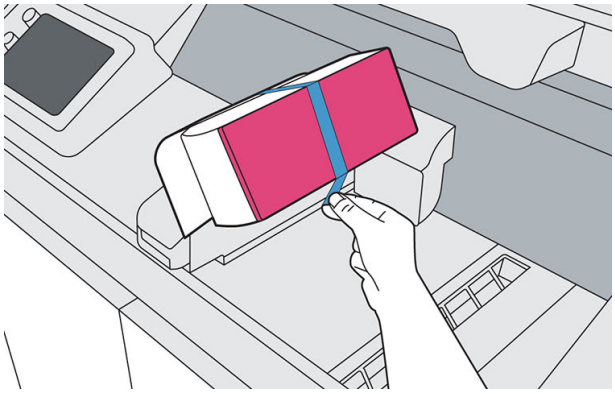


10. Pull the handle to unlock and rotate the lamp clockwise.

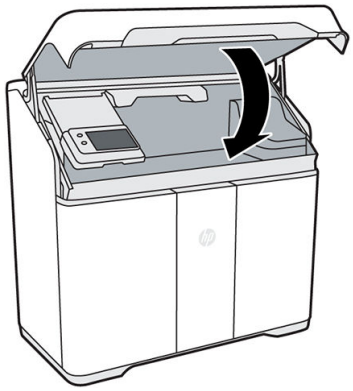




11. Remove the tape and foam from the lamp and wipe any fingerprints off the glass.



12. Push the lever to secure the lamp.
13. Close the top cover.



14. The printer automatically locks the top cover, moves the fusing carriage to its original location, checks the new lamp status, and calibrates the lamp.

Replace the cleaning roll

Replace the printhead cleaning roll immediately following the front panel message, to continue printing without damaging the printhead.

The cleaning roll is a roll of absorbent fabric used in the normal operation of the printer to wipe the printheads periodically: at the beginning and end of printing, while printing, on printhead check and clean, and so on. This helps the printheads to deliver agents continuously and maintain print quality.

The frequency of replacement depends on your use of the printer. The printer will not print when the cleaning roll needs to be replaced.

At the printer's front panel, tap , then **Cleaning roll** to see the status of the roll.

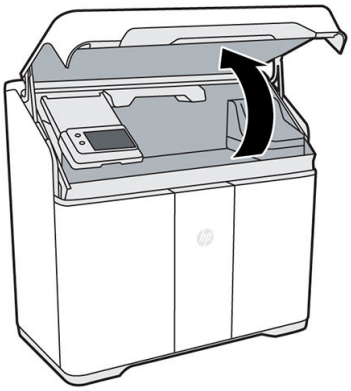
⚠ **CAUTION:** Do not touch or vacuum the fabric of the printhead cleaning roll. Any interference with the roll may prevent the printer from keeping track of roll usage, in which case you may see incorrect error messages, and a printing job may be canceled unnecessarily.

Tools needed

- Explosion-protected vacuum cleaner with a soft brush nozzle
- Nitrile gloves (required)

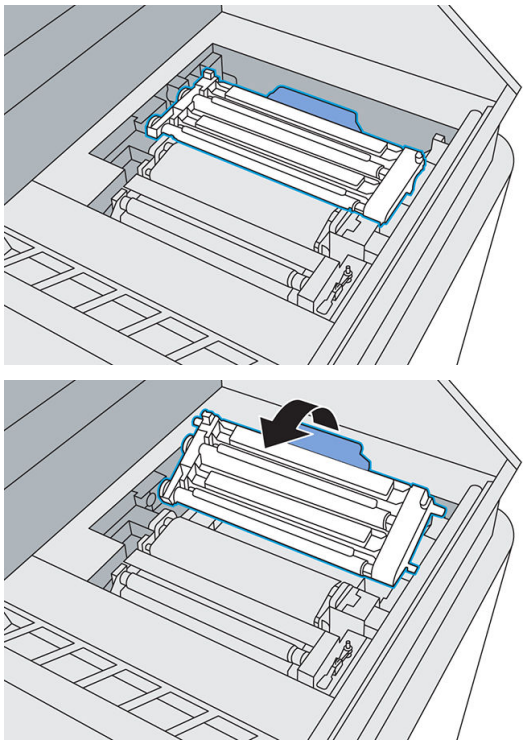
Procedure

1. Ensure that you have a new cleaning roll ready.
2. Tap **Replace cleaning roll** on the front panel.
3. Open the top cover.

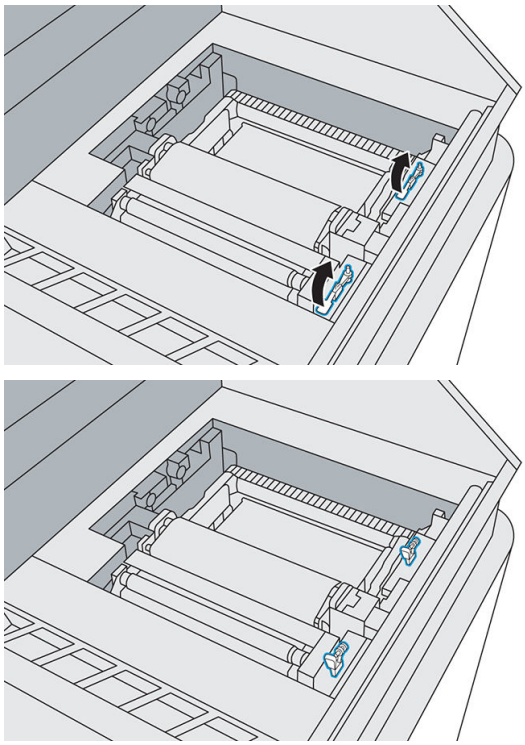


4. Put on gloves.
5. Ensure that no parts are left in the build chamber and that the print area is clean. See Clean the print area on page 114 if necessary.
6. Move the print carriage over the platform.

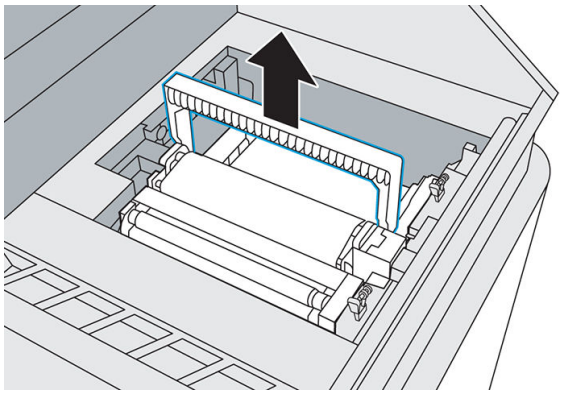
7. Remove the printhead cap by rotating it 20° and pulling it out.



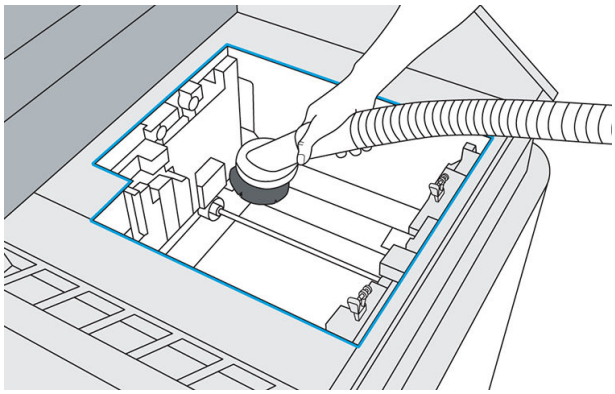
8. Disengage the two latches to release the cleaning roll module.



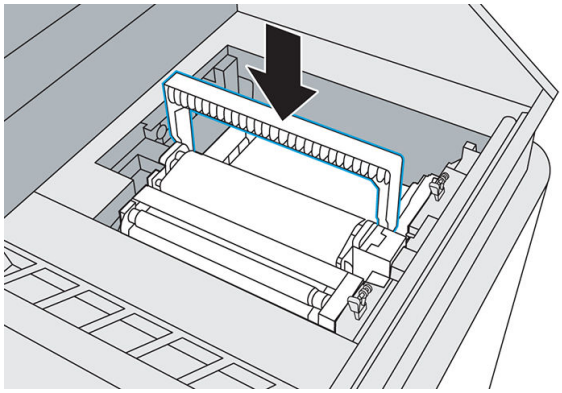
9. Rotate the handle until it is vertical, then pull it upwards to remove the cleaning roll module from the printer.



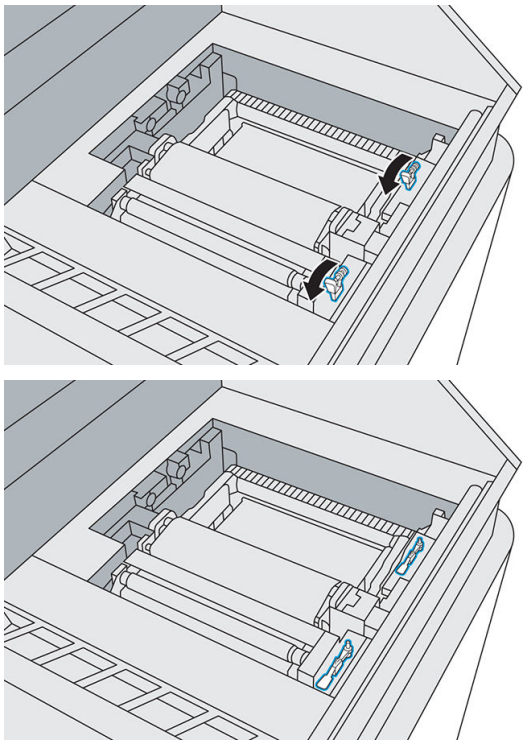
10. Transfer the used roll module to a container or bag and dispose of it according to local regulations.
11. Vacuum the cavity with the explosion-protected vacuum cleaner, using a soft brush nozzle.



12. Remove the packaging from the new module, then orient and insert it into the cavity.
13. Push down, and rotate the handle to close it.

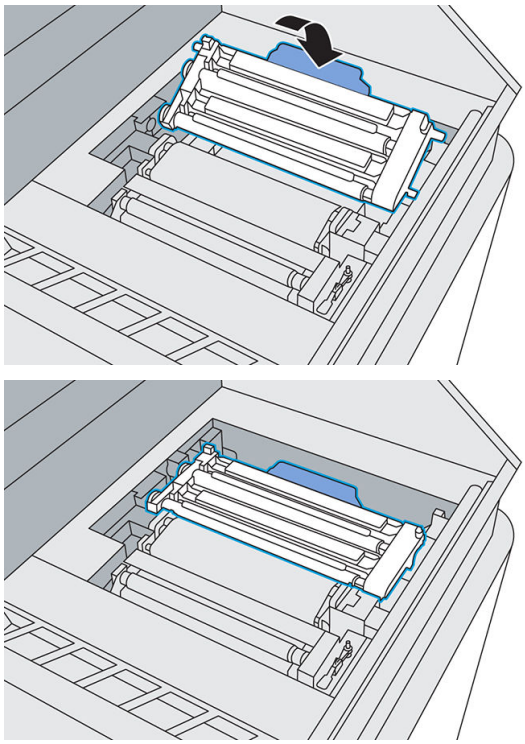


14. Engage the two latches to secure the cleaning roll module.



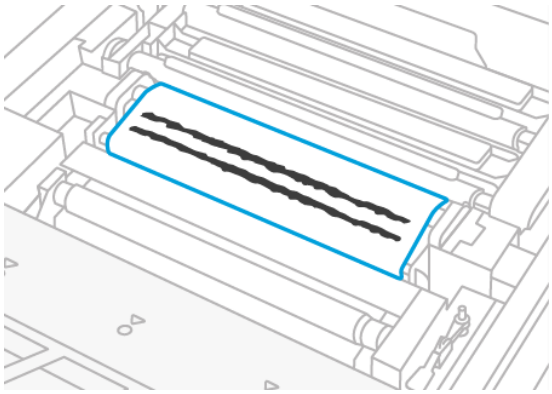
⚠ **CAUTION:** Ensure that the latches are pushed down as far as they will go.

15. Reinsert the printhead cap. See Replace the printhead cap on page 166.

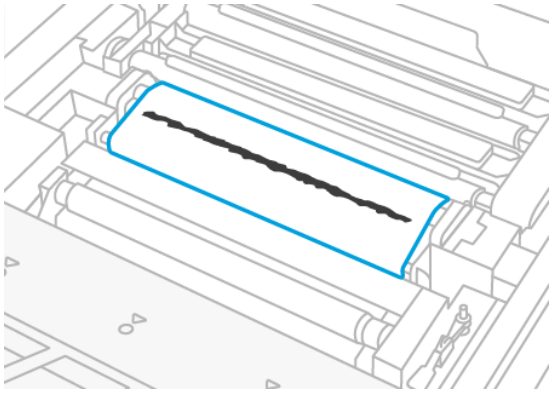


16. Move the print carriage back to its original position.
17. Close the top cover.
18. Tap **Finish and check** on the front panel.

    The roll rotates, then the print carriage returns to its home position.
19. Open the top cover to check that two marks appear on the roll. Tap **Two marks** on the front panel.



    If there is only one mark, tap **One mark** on the front panel; the cleaning roll may have been inserted incorrectly. Try reinserting the cleaning roll module, and ensure that the latches are fully engaged.



20. When you are sure that the cleaning roll module is working correctly, close the top cover.
21. Dispose of the contents of the vacuum cleaner according to local regulations.

Replace the material reclamation filter

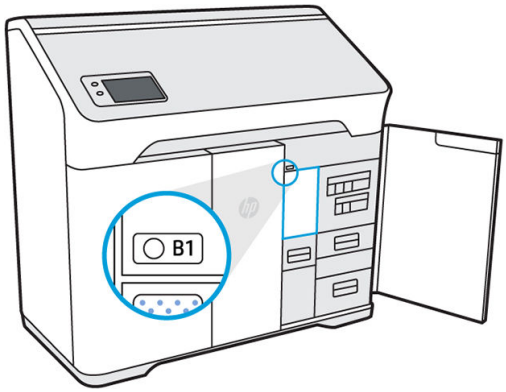
The front panel notifies you when the material reclamation filter needs to be replaced. Follow the steps on the front panel.

Tools needed

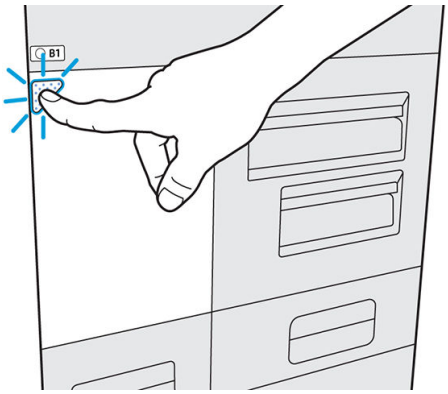
- SKU 8WA29A - Air Exhaust Filter
- Nitrile gloves (required)
- Mask (recommended)

Procedure

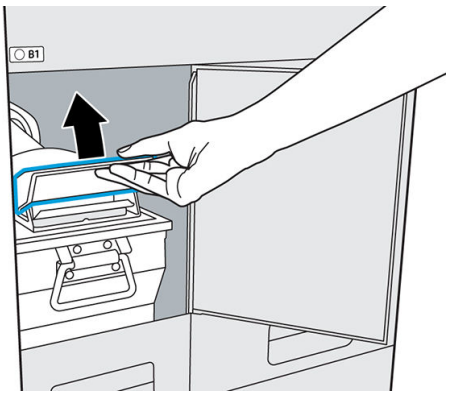
1. Open the agent door.

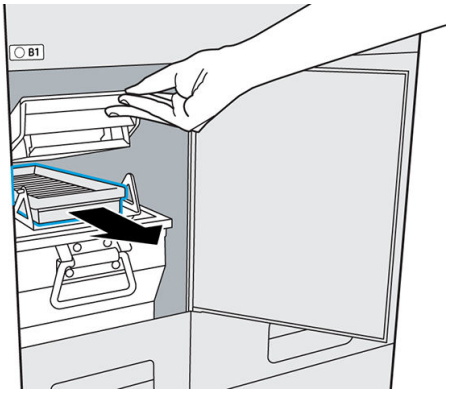


2. Check that the wayfinding LED is on, next to the access door to the material reclamation filter. Open the material reclamation filter by pushing the top left corner.

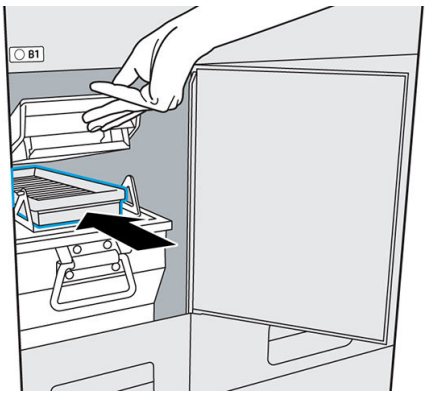


3. Unlock the latch, pull it up, then pull out the old filter.

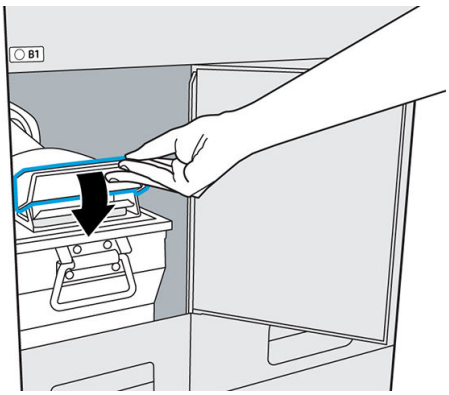




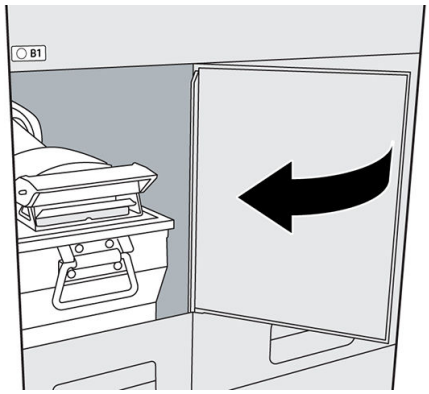
4. Remove the new filter from its packaging.
5. Insert the new filter into the slot.



6. Close the lid and latch it into place.



7. Close the access door.



8. Check that the wayfinding LED beside the filter is now off.
9. Close the agent door.
10. Tap **Finish and check** and then **OK** on the front panel.
11. Dispose of the old filter according to local regulations.

Replace the air exhaust filter

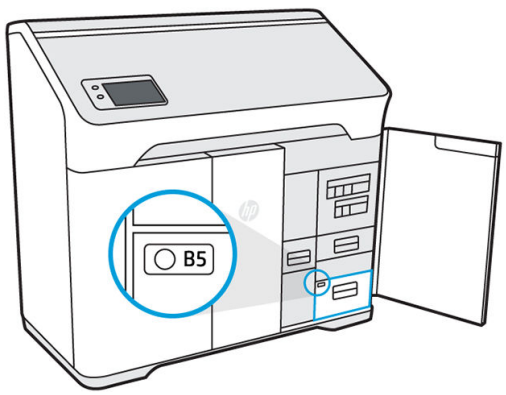
The front panel notifies you when the air exhaust filter needs to be replaced. Follow the steps on the front panel.

Tools needed

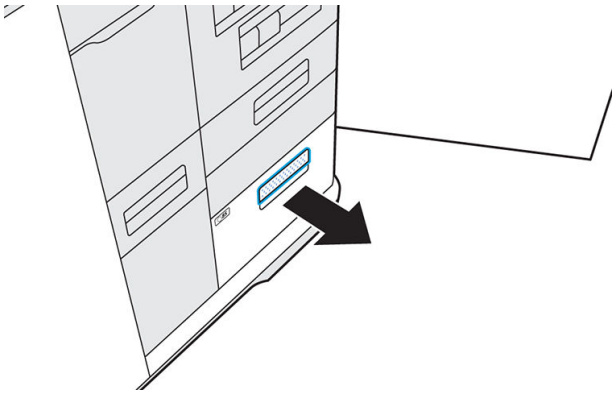
- SKU 8WA29A - Air Exhaust Filter
- Nitrile gloves (required)
- Mask (recommended)

Procedure

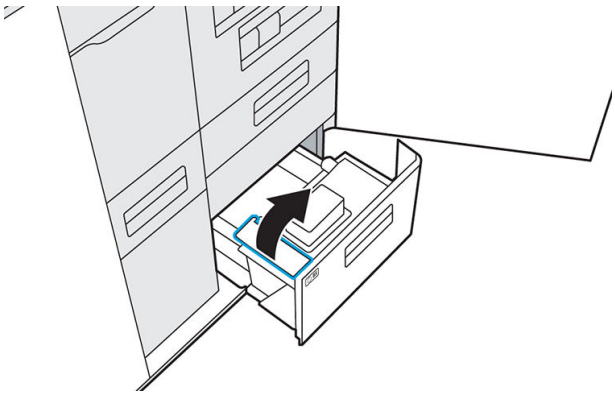
1. Tap **Replace air exhaust filter** on the front panel.
2. Open the agent door.



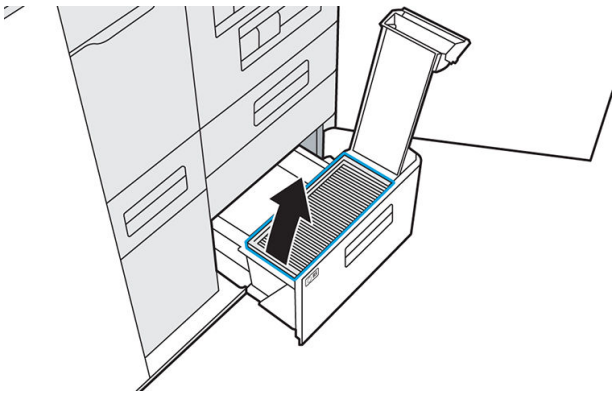
3. Open the B5 drawer by pulling the handle.



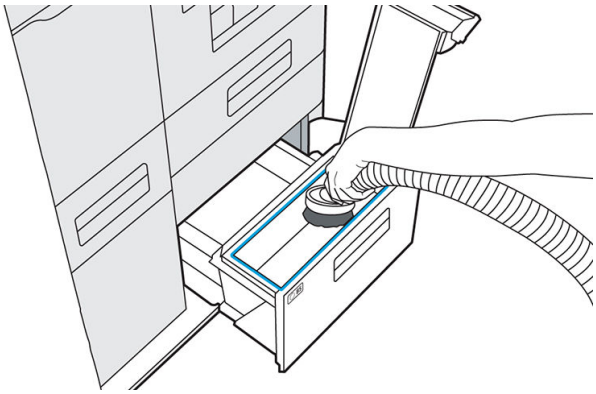
4. Unlatch the lid and open the compartment.



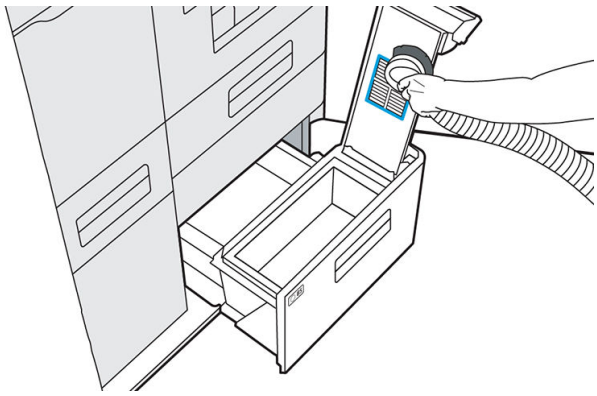
5. Remove the old filter.



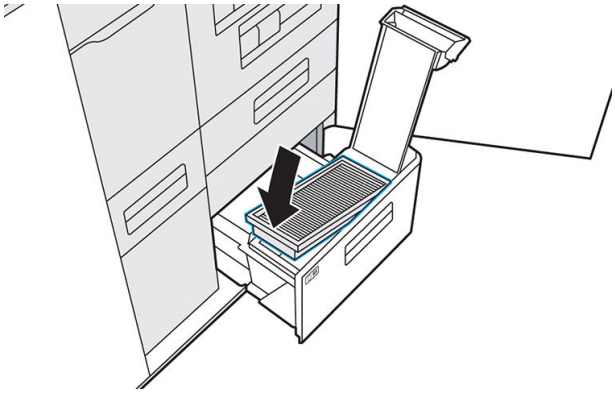
6. Vacuum any material in the compartment.



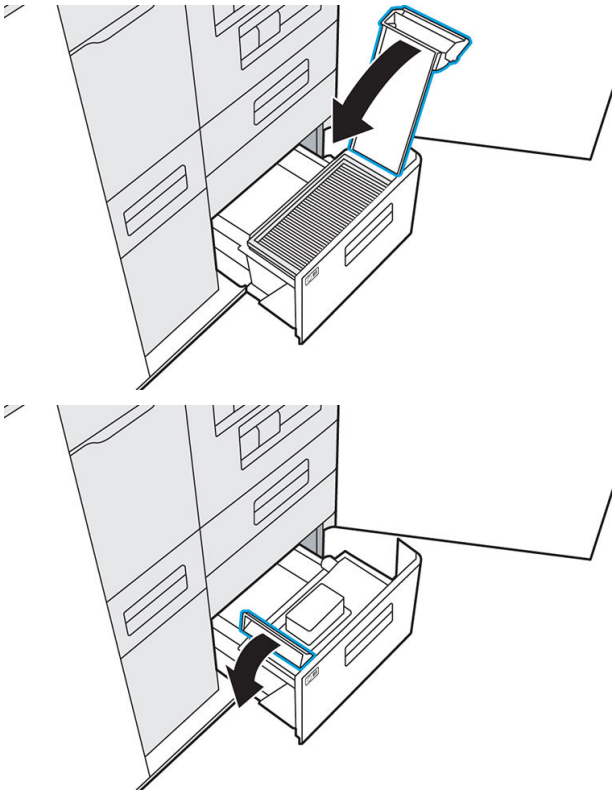
7. Vacuum the interior of the lid.



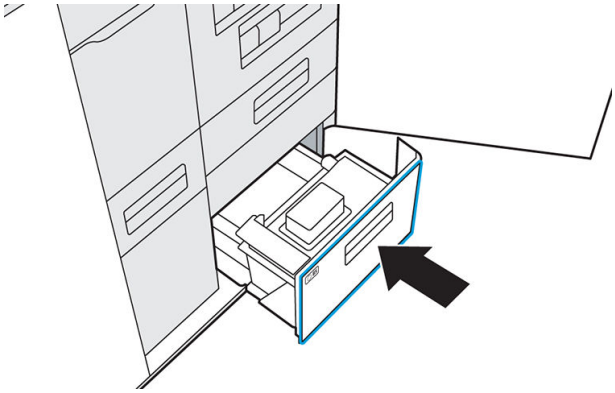
8. Insert the new filter.



9. Close and latch the lid.



10. Push the drawer back in.



11. Check that the air exhaust compartment LED is now off.
12. Close the agent door.
13. Tap **Finish and check** on the front panel.
14. Dispose of the old filter according to local regulations.

Replace a printhead

A printhead delivers agents and prints them onto the material in the build chamber.

⚠ **CAUTION:** Observe precautions when handling printheads because they are ESD-sensitive devices (sensitive to ElectroStatic Discharges). After removing the orange shipping caps, avoid touching components on the bottom of the printhead, and avoid putting the printhead down on the exposed nozzles.

This printer has two printheads, both of which must be present to complete the replacement process.

Status

At the printer's front panel, tap , then **Printheads**, then tap any printhead to see its status:

- **Not present**: The printer cannot detect the printhead.
- **Check pending**: The printhead needs to be checked.
- **Missing printhead**: The printhead is missing.
- **Reseat required**: The printhead needs to be removed and reinserted.
- **Remove**: The printhead needs to be removed.
- **Incompatible printhead**: The printhead is not compatible with the printer.
- **Printhead replacement incomplete; start again**: The printhead replacement process needs to be restarted.
- **Replacement required**: The printhead needs to be replaced.
- **Non-HP agent detected**: The printer has detected a non-HP agent among its consumables.
- **Ready**: The printhead is working normally.

Tools needed

- HP 3D400 Printhead Kit

  HP 3D400 Printhead Kit and/or HP 3D450 Color Printhead Kit
- Gloves (required)
- T20 screwdriver
- Lint-free cloth

NOTE: Printhead replacement is guided by the front panel, which will show you how to replace the printhead. The steps described below are meant to be done as prompted by the front panel. The procedure may be started by responding to an alert, or from the **Printhead detailed information** screen (accessed from the Supplies menu).

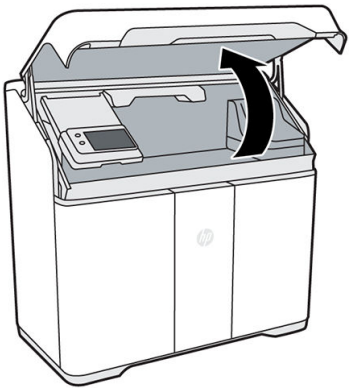
1. A new printhead must be acclimated to a normal operating temperature. If it has been shipped or stored in a cold environment, it may need up to 24 hours to reach operating temperature.
2. HP recommends wearing a mask.

   You will need a new priming tray (included in the printhead kit), and the alignment plate included with the printer. Ensure that the AP numbers on the printer and the plate match. Contact HP if they do not match.

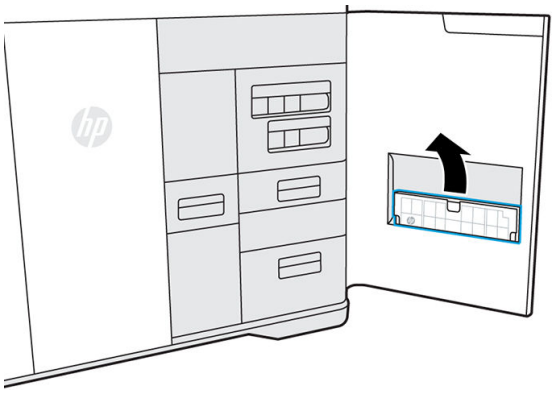
3. From the **Printhead detailed information** screen, tap **Replace** to be guided through the procedure.

NOTE: You may be prompted to replace agents before proceeding.

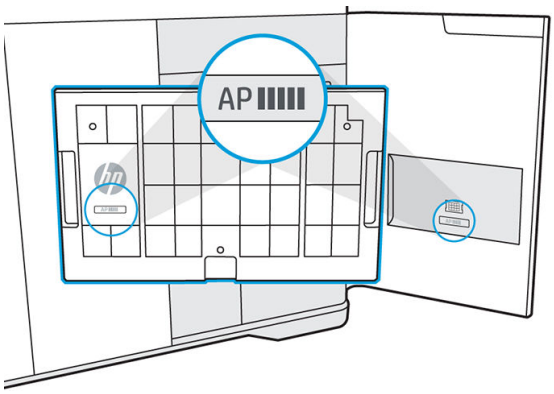
4. Close the top cover to permits checks to be done.
5. When the checks are completed, open the top cover.



6. Ensure that you have cleaned the print area since the last build. See Clean the print area on page 114.
7. Open the agent door and take the alignment plate from inside the door.



8. Ensure that the alignment plate AP number matches the number on the inside of the agent door. Close the door.

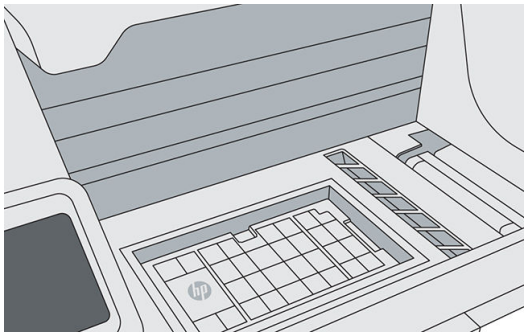


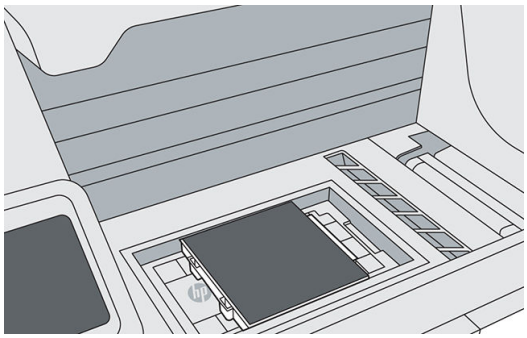
9. Tap **Continue** on the front panel.

10. Place the alignment plate on the build platform and then the priming tray on top of the alignment plate. Make sure the priming tray nests into place on the alignment plate by matching the feet on the bottom of the tray to the cutouts on the alignment plate.

⚠ CAUTION: Do not place the alignment plate and the priming tray on the build platform outside this procedure, because the build chamber may not be adjusted to the correct height, and could contact the print bars. The priming tray should be installed only as a part of the workflow process, when the build chamber is moved to the appropriate height.

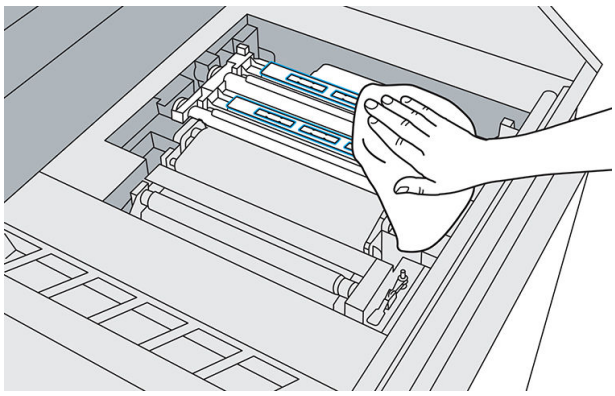
⚠ CAUTION: The black foam top is an essential part of the priming tray assembly. Do not remove it.



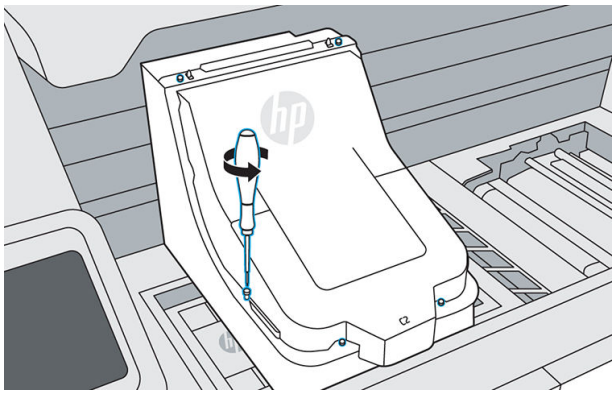


11. Close the top cover and tap **Continue** on the front panel. The print carriage will move to the left, then you can open the top cover again.

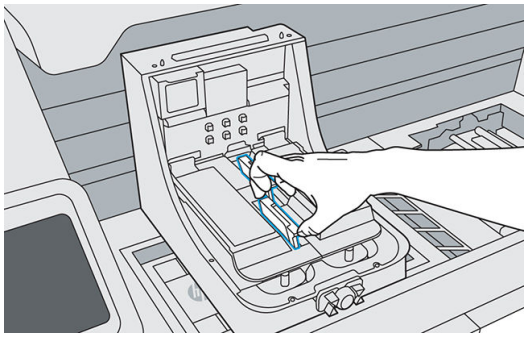
12. Inspect the printhead cap(s). If you see any liquid in the cap(s), remove it by blotting with a dry, lint-free cloth.

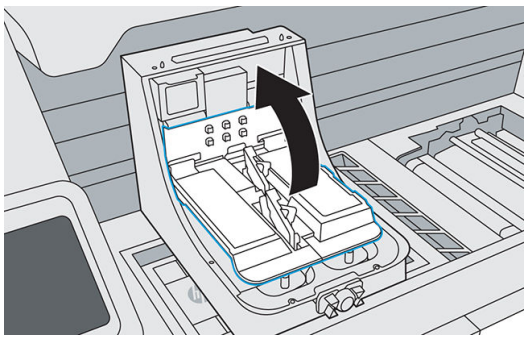


13. Use a screwdriver to loosen the six screws to remove the cover from the carriage, and carefully set aside the carriage cover.



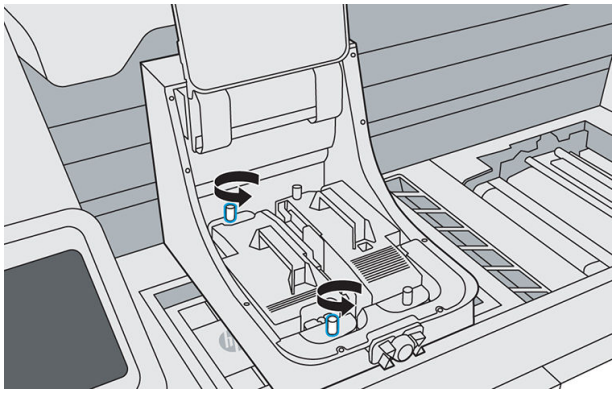
14. Release both clips, and lift the print-bar cover over the carriage. It will magnetically stay in place.



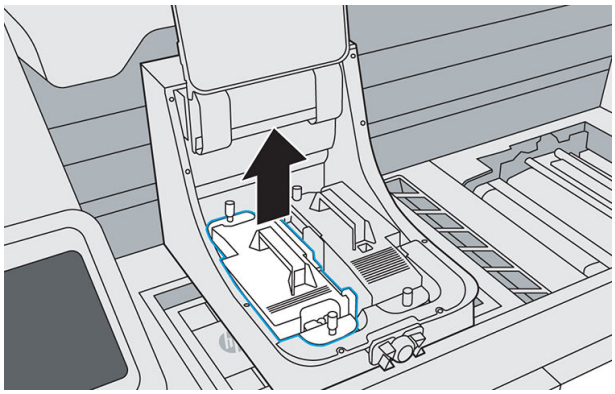


15. Loosen the two thumb screws at each end of the printhead until the printhead is released.

NOTE: Loosen only the screws of the printhead you intend to remove.



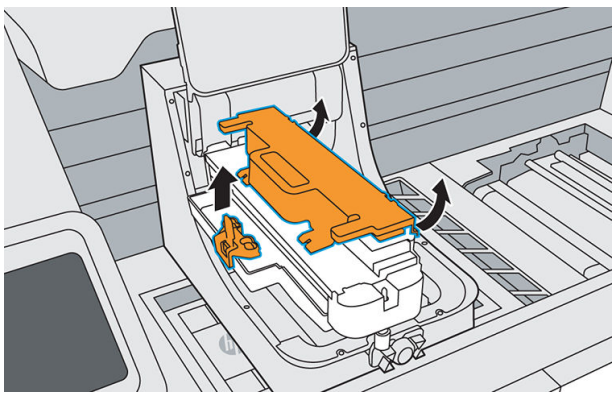
16. Carefully pull up the handle to remove the printhead, and place it on a flat surface with the nozzles facing up or to the side.



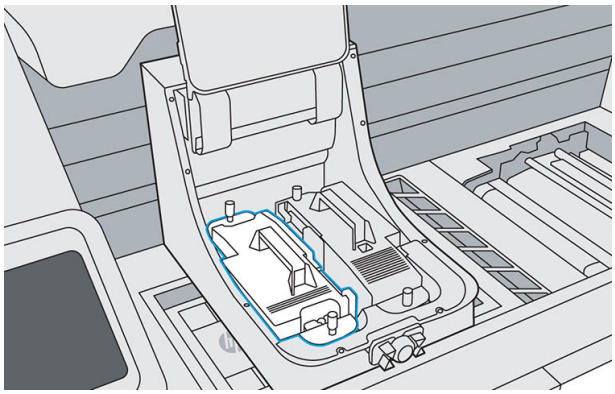
17. Make sure there are no obstacles and no material in the way of installing the new printhead. Vacuum the inside of the carriage if necessary.
18. Remove the packaging from the new printhead.
19. Check that the new printhead matches the slot.

    The monochrome and color printheads are shaped differently; furthermore, the side of the monochrome printhead is grey, while the side of the color printhead is purple.

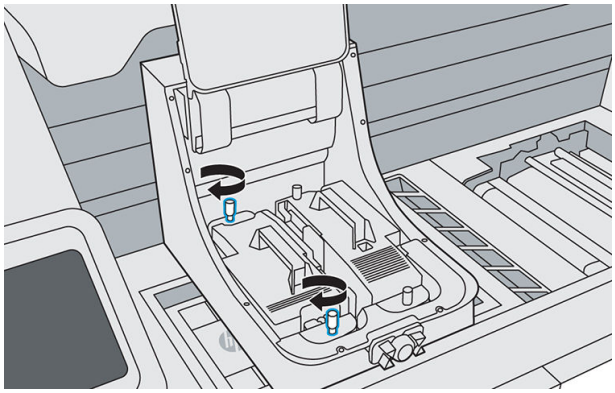
20. Remove the two orange caps. Later, put them onto the old printhead, before disposing of it according to local regulations.



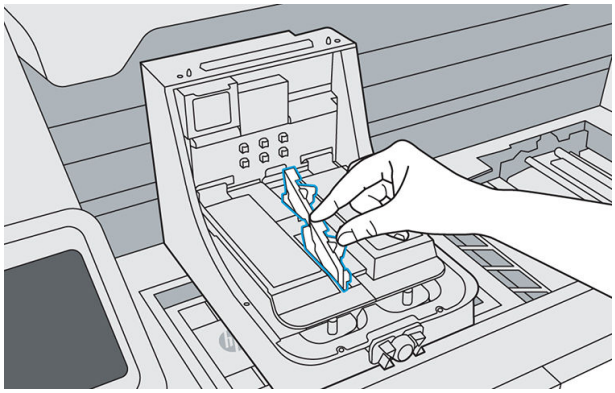
21. Orient and align the new printhead, then insert it into place, using the center post to guide the printhead. Ensure that all edges of the printhead lie flush with the carriage housing.



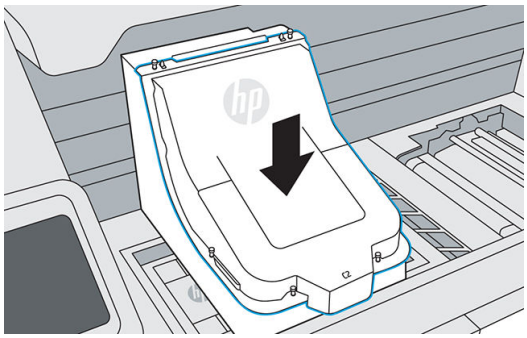
22. Push down and firmly tighten both thumb screws.

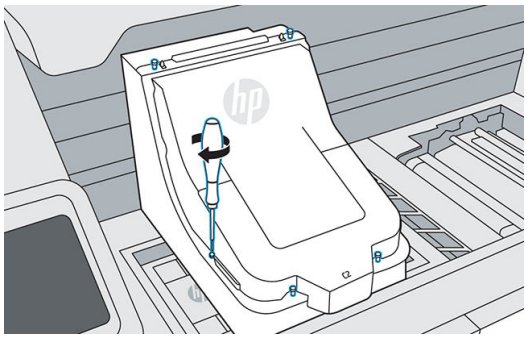


23. Pull down the printhead cover over the printhead, and secure both clips.

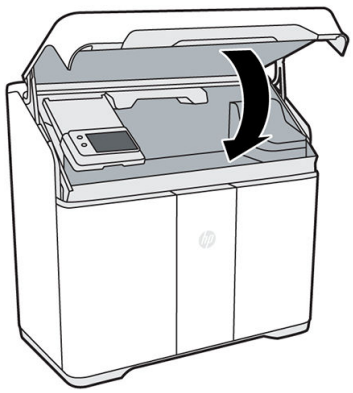


24. Put back the print carriage cover. Tighten the six screws.



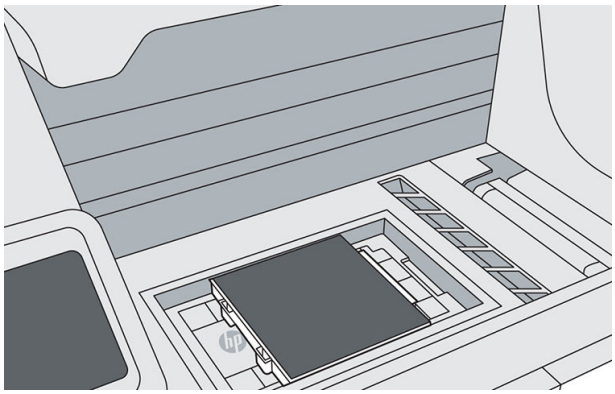


25. Tap **Finish & Check**. Leave the print carriage centered. Close the top cover and tap **Continue** on the front panel; when the priming tray is detected, tap **Prime**. Priming will take about 20 minutes.



26. If you have replaced two printheads, follow the instructions on the front panel to prime the second printhead. You do not need to replace the priming tray with a new one in order to do this.

27. When priming is complete, open the top cover, carefully remove the used priming tray, and leave the alignment plate in the build chamber, for use during the printhead alignment process.



28. Place the used priming tray in the bag in which it came, and dispose of it according to local regulations.
29. Launch the printhead alignment from the front panel by tapping **Calibrate printheads**.

NOTE: The printer cannot print until alignment has been completed.

Replace the print-area filter

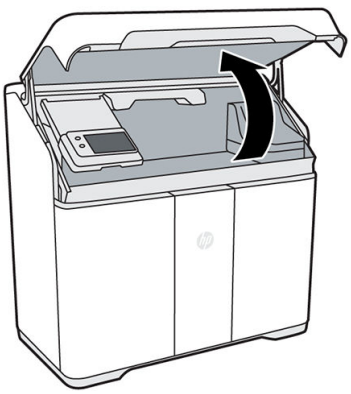
The front panel notifies you when the print-area filter needs to be replaced. Follow the steps on the front panel.

Tools needed

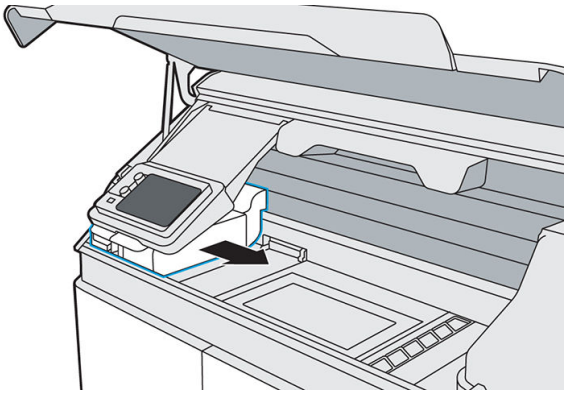
- SKU 8WA28A - Print Area Filter
- Nitrile gloves (required)
- Mask (recommended)

Procedure

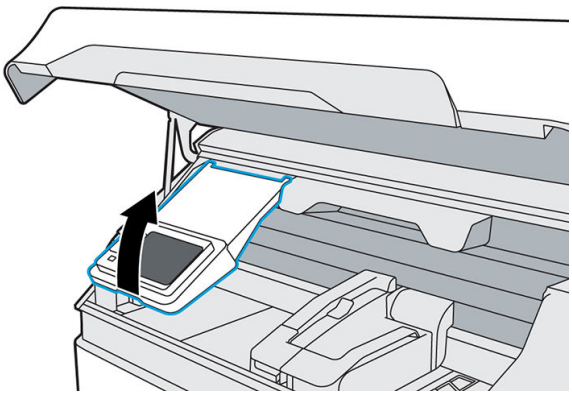
1. Tap **Replace print area filter** on the front panel.
2. Open the top cover.



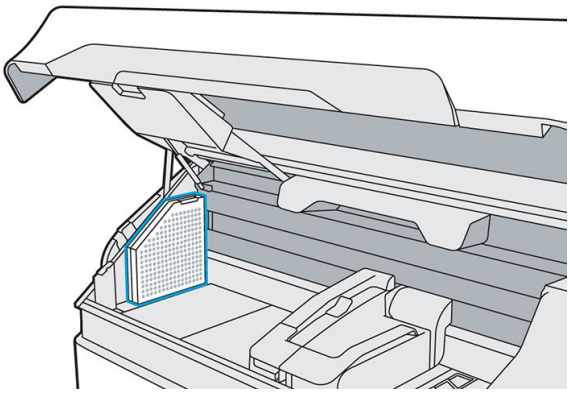
3. Pull the fusing carriage over the build chamber.



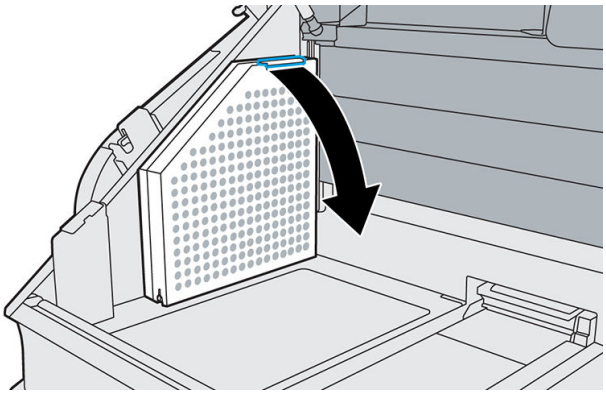
4. Lift up the front panel.



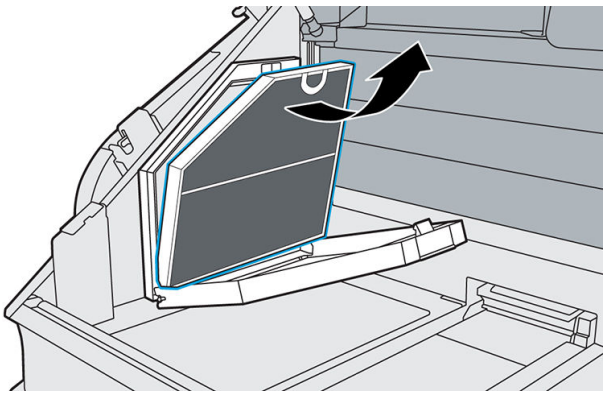
5. Locate the print-area filter on the left.



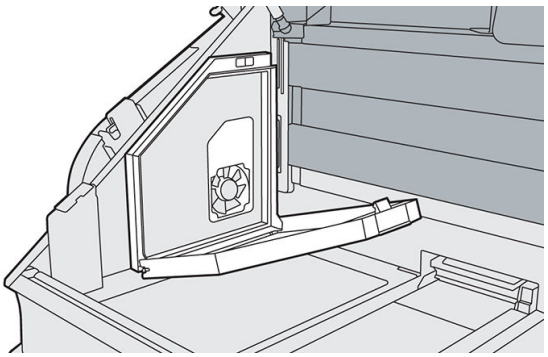
6. Disengage the latch on top of the filter.

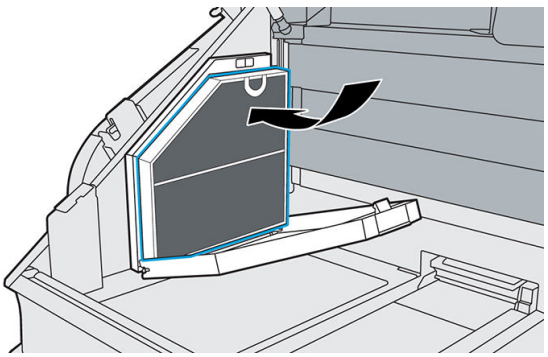


7. Remove the old filter.

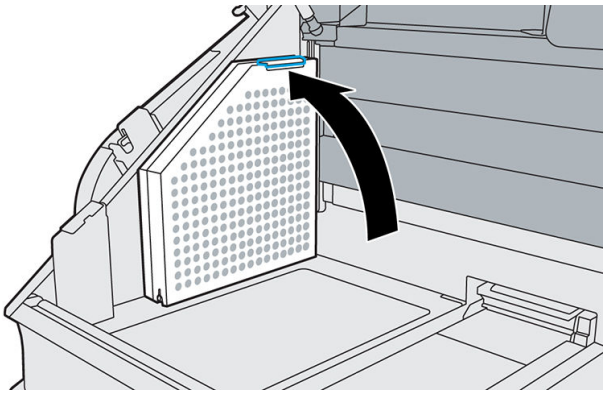


8. Insert the new filter, ensuring that the blue line on the filter is facing the interior of the print area.

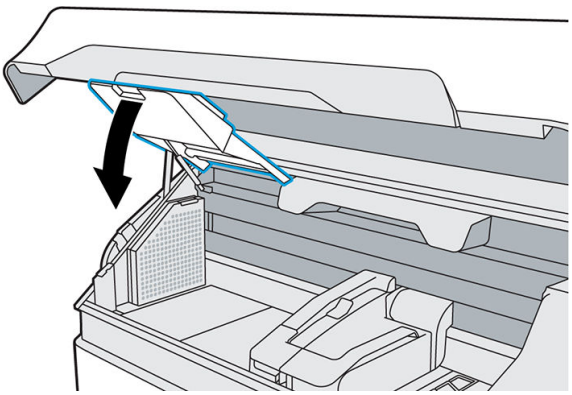




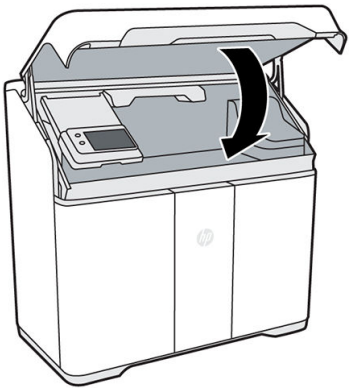
9. Close the cover and reengage the latch.



10. Lower the front panel.



11. Optionally, move the fusing carriage back to its home position.
12. Close the top cover.



The carriage automatically returns to its home position, if it is not already there.

13. Tap **Finish and check** on the front panel.
14. Dispose of the old filter according to local regulations.

Replace the air intake filter

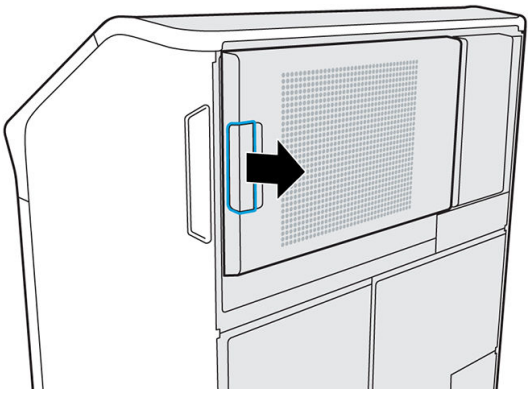
The front panel notifies you when the air intake filter needs to be replaced. Follow the steps on the front panel.

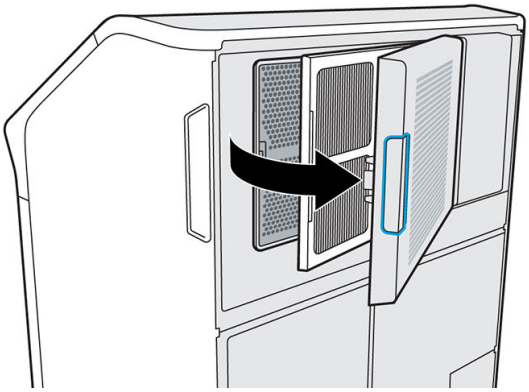
⚠ **CAUTION:** Do not open the air intake filter door while printing.

Tools needed

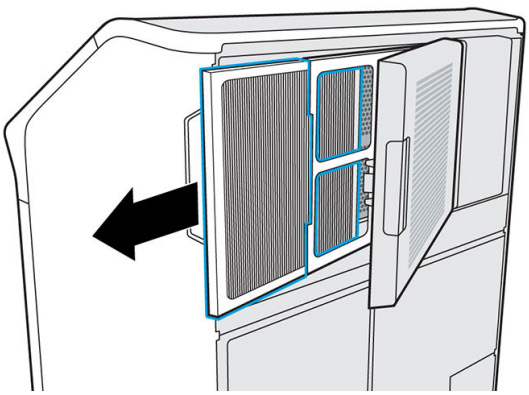
- SKU 8WA27A – Air Inlet Filter
- Nitrile gloves (required)

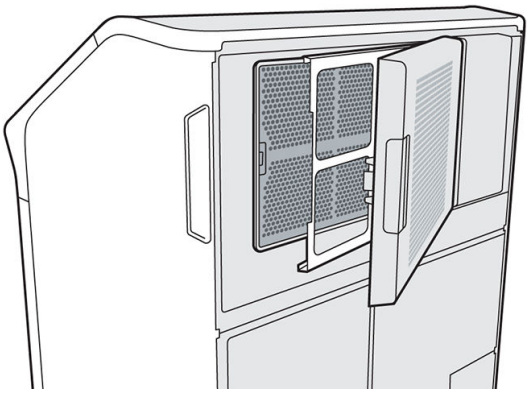
1. Tap **Replace air intake filter** on the front panel.
2. Release the latch at the rear right of the printer to open the access door.



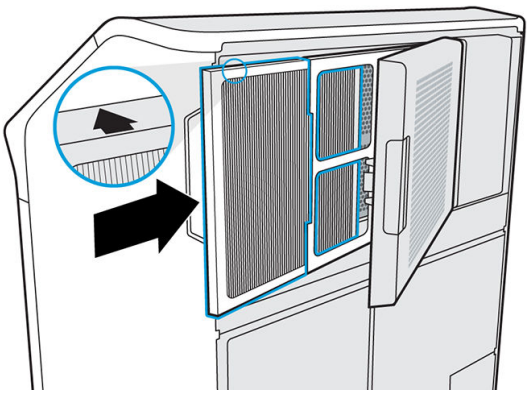


3. Slide out the used filter.

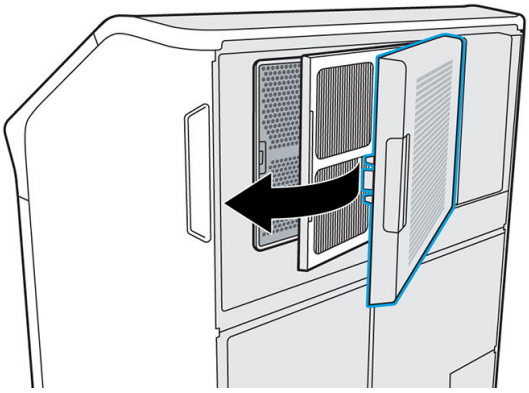


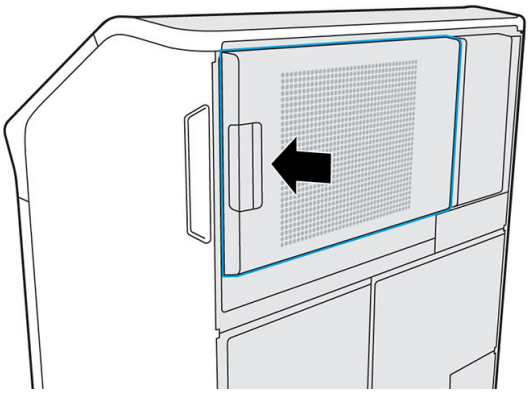


4. Insert the new filter. The arrows on it should be pointing towards the printer.



5. Close the filter cover and the access door (which clicks into place).





6. Tap **Finish and check** on the front panel.
7. Dispose of the used filter according to local regulations.

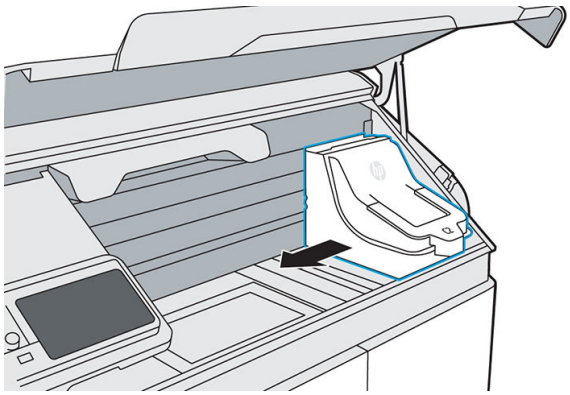
Replace the printhead cap

Tools needed

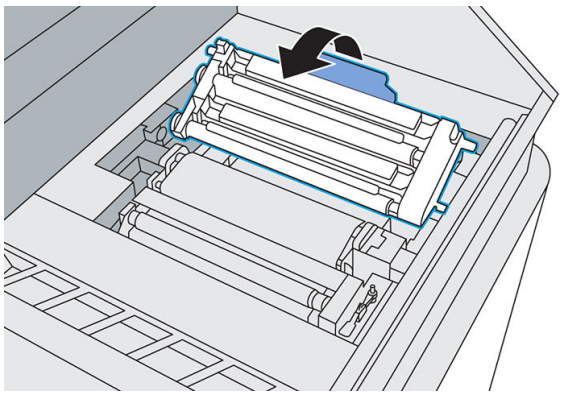
- Nitrile gloves (required)

Procedure

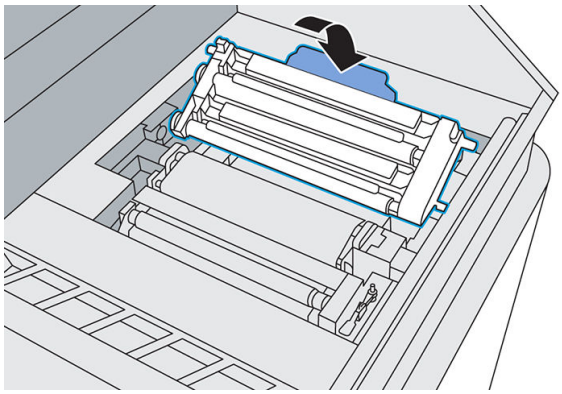
1. Move the print carriage over the build chamber.



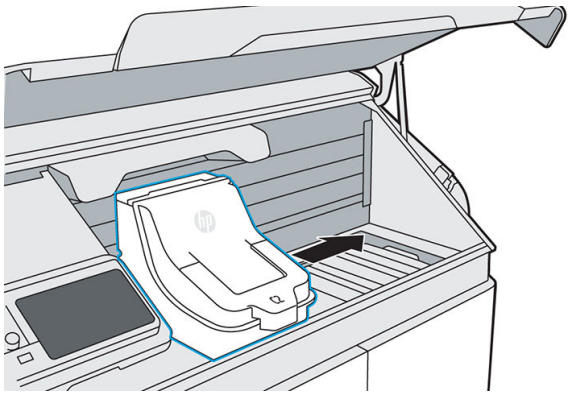
2. Remove the printhead cap.



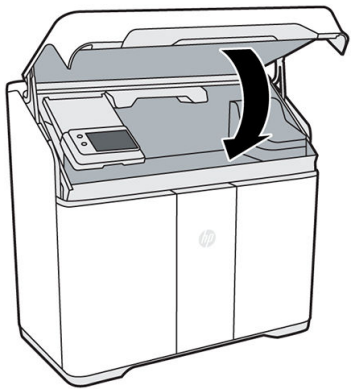
3. Insert the new printhead cap.



4. Move the print carriage back to the right.



5. Close the top cover.



6. Dispose of the old printhead cap according to local regulations.

Align the printheads

HP recommends printhead alignment in these situations:

- After replacing or reseating a printhead
- After a printhead crash

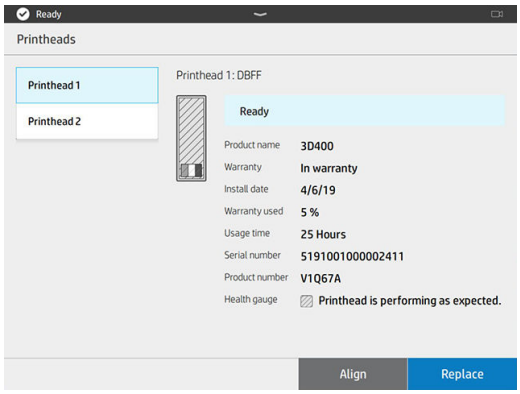
- When there are print-quality problems that could be caused by printhead misalignment

Tools needed

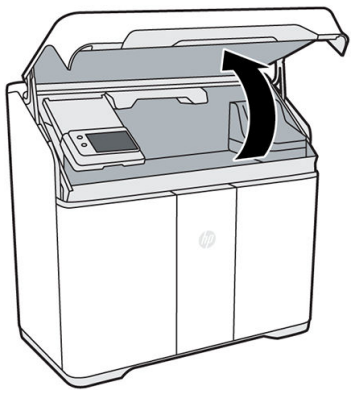
- Nitrile gloves (required)
- Eight sheets of plain white, A4- or US-Letter-sized paper

  HP recommends paper with ColorLok technology. This paper is designed for inkjet technology and it provides the best color contrast.

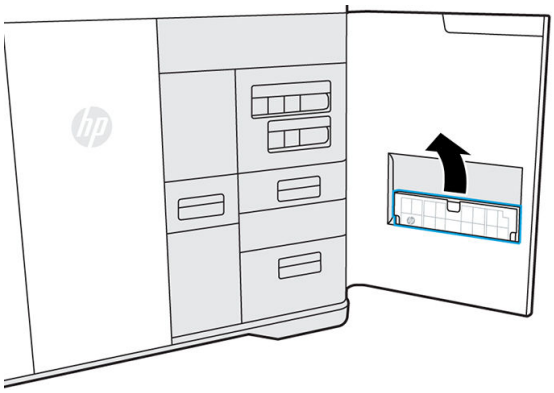
1. If you have just replaced the printhead(s), skip to step 6.
2. Go to the front panel and tap , then the **Printheads** tab, then **Align**.



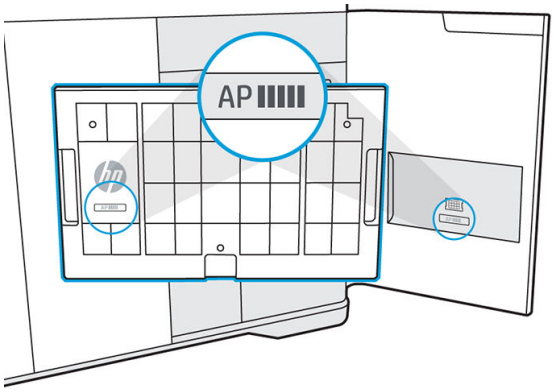
3. Open the top cover.



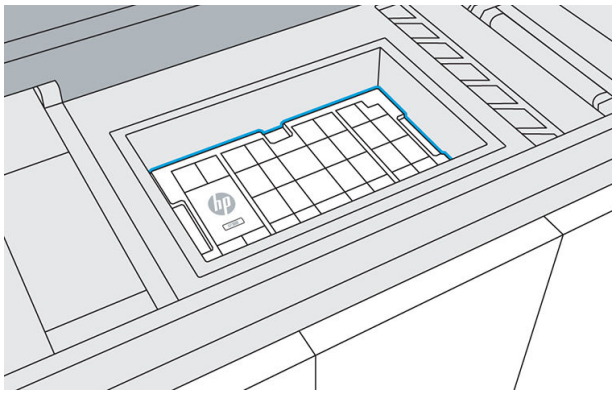
4. Open the agent door, and take the alignment plate from inside the door.



Each printer has one alignment plate. The number on the plate should match the number on the door.

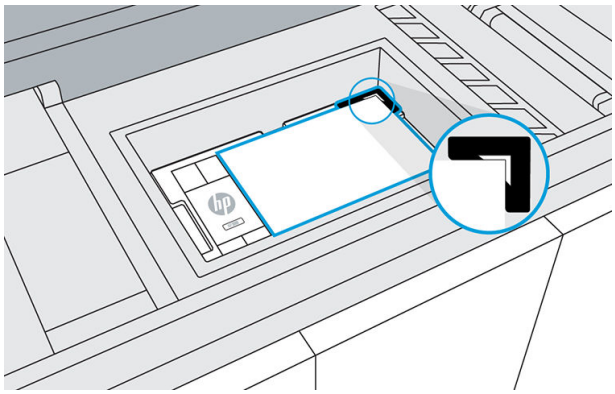


5. Put the alignment plate on the build platform and push it down as far as it will go. The HP logo on the plate should be facing up on the left of the build chamber.

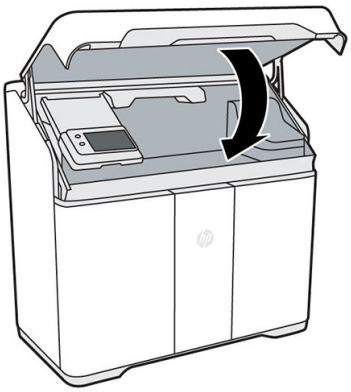


6. Select eight sheets of plain white, A4- or US-Letter-sized paper, removing any pieces that are bent or torn.

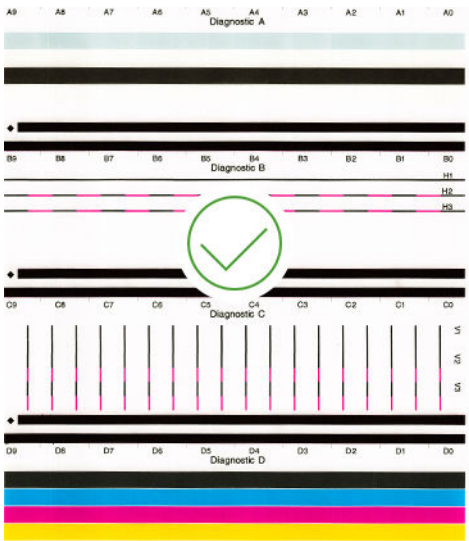
7. Load one sheet of paper on top of the alignment plate, using the guides at the upper right corner for correct placement.

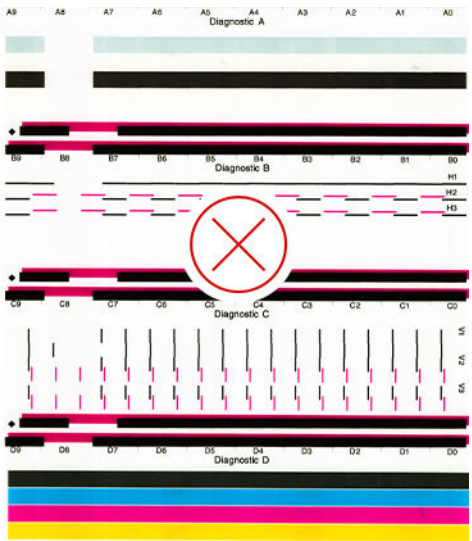


8. Close the top cover and tap **Print** on the front panel to print a test page.

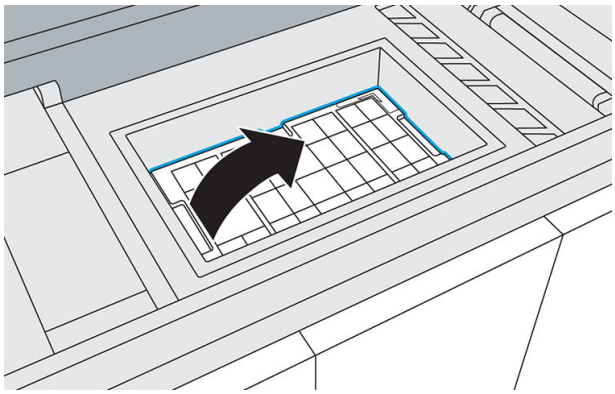


9. Open the top cover.
10. Remove the printed test page.
11. Check the printed test page. Lines on the test pages should be straight and continuous; otherwise, action may be needed.



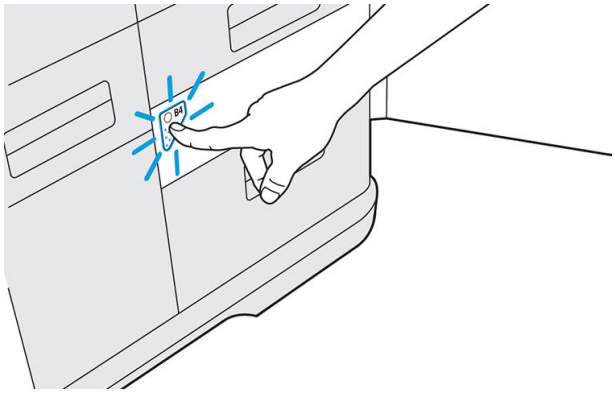


12. Load another sheet of paper on top of the alignment plate.
13. Close the top cover and tap **Print** to print the first alignment page.
14. Open the top cover and remove the alignment page.

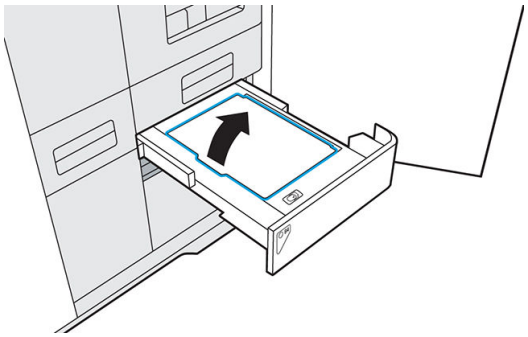


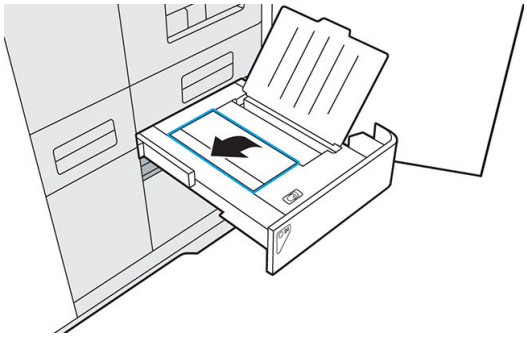
15. Push the cover of scanner drawer B4 to release and open the drawer.

NOTE: HP recommends cleaning the scanner before using it. Make sure there is no material on the scanner glass. See Clean the scanner on page 134.

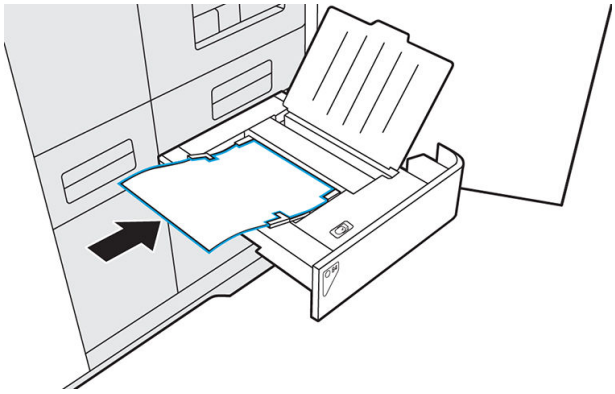


16. Open the scanner paper input and paper output trays to prepare the scanner for use.

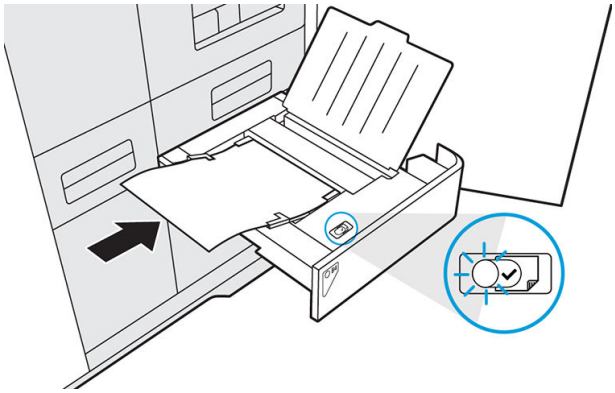




17. Load the first alignment page face-down on the scanner input tray.

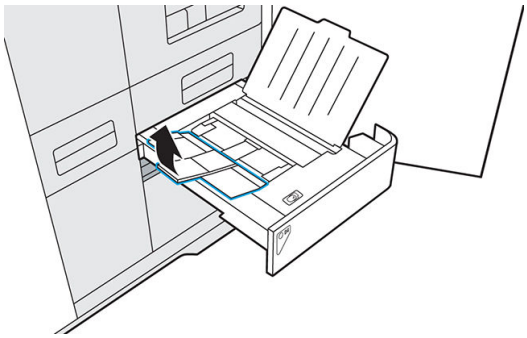


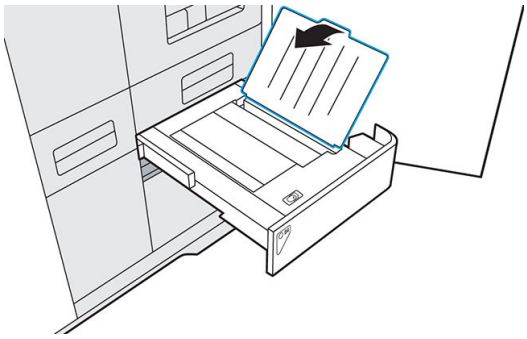
When paper is detected, the paper LED turns on.



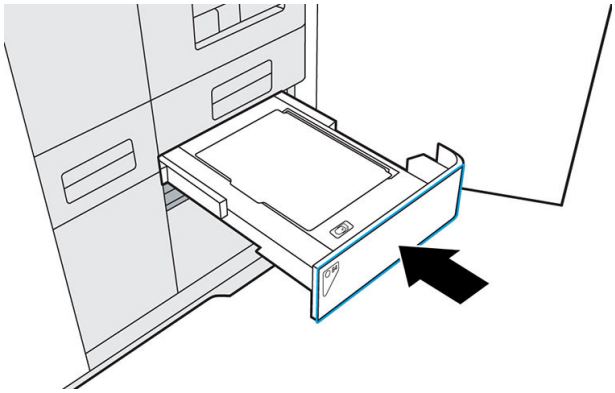
18. Tap **Scan** on the front panel.
19. Repeat this process for all eight alignment pages.

20. When the last page has been scanned, remove all alignment pages and close the paper trays.



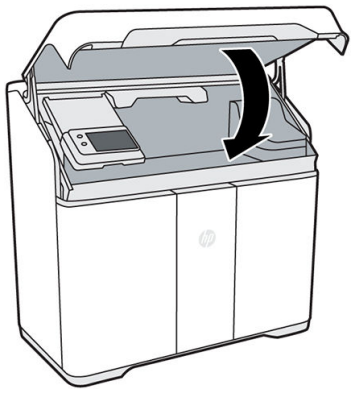


21. Push in the scanner drawer to close it.



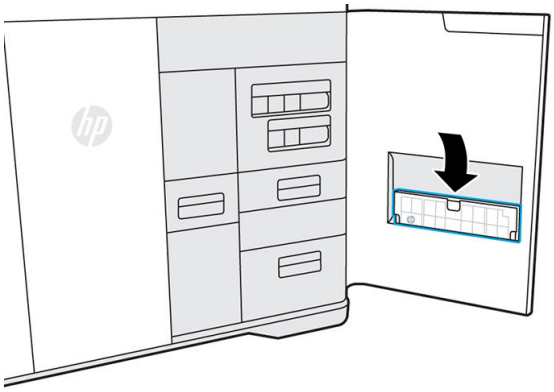
22. Load another sheet of paper onto the alignment plate.

23. Close the top cover and tap **Print**.



24. A second test page is printed to confirm printhead alignment. Lines on the test pages should be straight, continuous, and the same color. Otherwise, further troubleshooting may be required.

25. Remove the alignment plate, and store it inside the agent door.



26. Close the agent door.

27. Close the top cover.

16 Move or store the printer

IMPORTANT: If your printer needs to be moved to a different location or room, you should contact your reseller for assistance. The printer has sensitive components that can be damaged during transportation: special transportation features and tools are needed.

Do not move the printer for any purpose without service assistance. Additional packing precautions and installation calibrations are required for significant displacements of the printer.

Before turning off the printer, ensure that the printing carriage is in its home position. Then follow the shut-down procedure.

If the printer has been shipped, agent cartridges and printheads may need up to 24 hours to acclimate to operating temperature, depending on previous and current temperatures.

If you intend only to store the printer without moving it to a different location, leave it plugged in if feasible, and use the away mode. See Away mode on page 22.

To store the printer for an extended period of time (longer than a weekend), first clean it, ensuring that there is no material left inside. See Clean the print area on page 114.

The printer should be stored at a temperature of –25°C to +55°C (–13 to +131°F) and humidity of less than 90% (without condensation).

17 Print-quality optimization

General advice on page 176

General advice

When you have any print-quality problem:

- To achieve the best performance from your system, use only genuine manufacturer's supplies and accessories, whose reliability and performance have been thoroughly tested to give trouble-free performance and best-quality prints.
- Check that your environmental conditions (temperature, humidity) are in the recommended range.
- Check that your material cartridges and printheads have not passed their expiration dates.
- Check that you are using the most appropriate settings for your purposes.

For the latest information, see:

- http://www.hp.com/go/jetfusion580/support/

The following procedures may help to solve some print-quality issues, see specific print-quality issues for details if the issue is detected:

- Align the printheads on page 167
- Printhead troubleshooting on page 94

18 Ordering information and end-of-life recommendations

This chapter lists the available supplies and accessories, and their part numbers, at the time of writing.

Contact your support representative and check that what you want is available in your area and for your model.

Table 18-1 Name and part numbers

Part numbers	Name	End-of-life recommendations
V1Q67A	HP 3D400 Printhead Kit	Dispose[1]
8WA30A	HP 3D400 Printhead Cleaning Roll	HP Planet Partners Program[2]
V1Q80A	HP 3D400 500ml Detailing Agent	HP Planet Partners Program[2]
V1Q70A	HP 3D450 250ml Black Agent	HP Planet Partners Program[2]
V1Q71A	HP 3D400 500ml Fusing Agent	HP Planet Partners Program[2]
V1Q81A	HP 3D400 250ml Bright Fusing Agent	HP Planet Partners Program[2]
V1Q73A	HP 3D450 250ml Yellow Agent	HP Planet Partners Program[2]
V1Q74A	HP 3D450 250ml Magenta Agent	HP Planet Partners Program[2]
V1Q75A	HP 3D450 250ml Cyan Agent	HP Planet Partners Program[2]
V1Q76A	HP 3D450 Color Printhead Kit	Dispose[1]
V1R30A	HP 3D HR CB PA 12 10L/4 kg Material	If empty, locallly recyclable. If full or partially full, dispose[1]
8WA27A	HP 3D400 Air Inlet Filter	Dispose[1]
8WA28A	HP 3D400 Print Area Filter	Dispose[1]
8WA29A	HP 3D400 Air Exhaust Filter	Dispose[1]
230U6A	HP 3D 500/300 Series 2nd Gen Lamp Module	HP Planet Partners Program[2]

[1] Dispose of such items in compliance with federal, state, and local regulations. Consult your local authorities to determine the correct manner in which to dispose of waste.

[2] Visit to see how to participate and for HP Planet Partners program availability: the program may not be available in your area. Where this program is not available, and for other consumables not included in the program, consult your local waste authorities on appropriate disposal.

19 System errors

The system may occasionally display a system error, consisting of a numerical code of 12 digits followed by the recommended action that you should take.

In most cases you will be asked to restart the printer. When the printer starts, it can diagnose the issue better and may be able to fix it automatically. If the problem persists after restarting, contact your support representative and be ready to give the numerical code from the error message. If the error message contains some other recommended action, follow the instructions.

20 When you need help

Request support on page 179

Customer Self-Repair on page 179

Service information on page 179

Request support

Support is provided by your support representative: usually from the company from which you bought the printer. If this is not the case, contact HP Support on the Web:

- http://www.hp.com/go/jetfusion580/support/

Before calling your support representative, prepare for the call as follows:

- Review the troubleshooting suggestions in this guide.
- Review your software documentation, if relevant.
- Check that you have the following information ready:
  - The product and serial numbers of the printer you are using.
  - If there is an error code on the front panel, make a note of it. See System errors on page 178.
  - The name and version number of your software.
  - If you have a print-quality problem, the name and product number of the material that you were using.

Customer Self-Repair

HP's Customer Self-Repair program offers our customers the fastest service under either warranty or contract. It enables HP to ship replacement parts directly to you (the end user) so that you can replace them. Using this program, you can replace parts at your own convenience.

Convenient and easy to use

- Your support representative will diagnose and assess whether a replacement part is required to address a defective hardware component.

For more information about Customer Self Repair, see http://www.hp.com/go/selfrepair/.

Service information

The Command Center can produce on request a list of many aspects of the printer's current status, some of which may be useful to a service engineer trying to fix a problem.

21 Accessibility

Front panel on page 15

Front panel

If required, the front-panel display brightness and the loudspeaker volume can be changed.

Change system options on page 18

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