DESIGNJET L28500 printer series

User's guide

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1 Introduction

Safety precautions

Before using your printer, read the following safety precautions to make sure you use the equipment 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 take appropriate measures to minimize the risks to yourself and to other people.

General safety guidelines

- There are no operator-serviceable parts inside the printer except those covered by HP's Customer Self Repair program (see http://www.hp.com/go/selfrepair/). Refer servicing of other parts to qualified service personnel.

- Turn off the printer and call your service representative in any of the following cases.

  - The power cord or plug is damaged.

  - Liquid has entered the printer.

  - There is smoke or an unusual smell coming from the printer.

  - The printer has been dropped or the drying or curing module has been damaged.

  - The printer's built-in Residual Current Circuit Breaker (Ground Fault Circuit Interrupter) has been repeatedly tripped.

  - The printer is not operating normally.

- Turn off the printer in either of the following cases.

  - During a thunderstorm

  - During a power failure

Electrical shock hazard

⚠ **WARNING!**   The drying and curing modules operate at hazardous voltages capable of causing death or serious personal injury.

Ensure that the power is disconnected from the branch circuit breaker of the PDU, and that the printer's main power switch is off, before servicing the printer.

To avoid the risk of electric shock:

- Do not attempt to dismantle the drying and curing modules or the electrical control cabinet.

- Do not remove or open any other closed system covers or plugs.

- Do not insert objects through slots in the printer.

- Test the functionality of the Residual Current Circuit Breaker (RCCB) every 6 months.

Heat hazard

The drying and curing subsystems of the printer operate at high temperatures and can cause burns if touched. To avoid personal injury, take the following precautions.

- Do not touch the internal enclosures of the printer's drying and curing modules. Even after opening the window latch that disconnects drying and curing power, the internal surfaces could be hot.

- Take special care when accessing the substrate path.

Fire hazard

The drying and curing subsystems of the printer operate at high temperatures. Call your service representative if the printer's built-in Residual Current Circuit Breaker (Ground Fault Circuit Interrupter) is repeatedly tripped.

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

- Use the power supply voltage specified on the nameplate.

- An electrician is required for the setup and configuration of the building's electrical system used to power the printer, and for printer installation. Make sure that your electrician is appropriately certified according to local regulations and supplied with all the information regarding the electrical configuration.

- The electrician should connect the power cord as specified in the *Site preparation guide* and *Assembly instructions.* Three-phase lines are required, each protected by a branch circuit breaker. The power cable is not provided with the printer.

- Do not insert objects through slots in the printer.

- Take care not to spill liquid on the printer.

- Do not use aerosol products that contain flammable gases inside or around the printer.

- Do not block or cover the openings in the printer body that are provided for ventilation.

- Do not attempt to dismantle the drying or curing module, or the electrical control cabinet.

- Ensure that the operating temperature of the substrate, as recommended by its manufacturer, is not exceeded. If this information is not available from the manufacturer, be sure to use only substrates suitable for operating temperatures of 125°C (257°F) or higher.

- Do not load substrates with auto-ignition temperatures below 250°C (482°F). See note below.

> **NOTE:** Test method based on EN ISO 6942:2002; Evaluation of materials and material assemblies when exposed to a source of radiant heat, method B. The test conditions, to determine the temperature when the substrate starts ignition (either flame or glow) were: Heat flux density: 30 kW/m², copper calorimeter, K type thermocouple.

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 the printer's 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 the printer's 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 touch gears or moving rolls during printing.

Heavy substrate hazard

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

- Handling heavy substrate rolls may require more than one person. Care must be taken to avoid back strain and/or injury.

- Consider using a forklift, pallet truck, or other handling equipment.

- When handling heavy substrate rolls, wear personal protective equipment including boots and gloves.

Ink handling
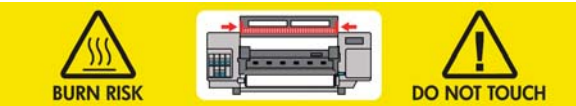
Your printer does not use solvent inks and does not have the traditional problems associated with them. However, HP recommends that you wear gloves when handling ink system components.

Warnings and cautions

The following symbols are used in this manual to ensure the proper use of the printer and to prevent the printer 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

Label	Explanation
	Risk of burns. Do not touch the internal enclosures of drying and curing modules of the printer.
	Risk of burns. Do not touch the drying enclosure of the printer. Even after opening the window latch, which disconnects the power to the drying and curing modules, the internal surfaces could be hot.
	Electric shock hazard. There are no operator-serviceable parts inside the printer. Refer servicing to qualified service personnel.

Label	Explanation
SEE INSTALLATION INSTRUCTIONS BEFORE CONNECTING TO THE SUPPLY.	See installation instructions before connecting to the supply. Ensure that the input voltage is within the printer's rated voltage range, and select the correct printer 3-phase configuration.
	Risk of trapped hands.
	Risk of trapped fingers. Do not touch spindle gears while moving.
DO NOT PUT OBJECTS ON TOP	Do not put objects on top of the printer. Do not cover the top fans.
	You are recommended to wear gloves when handling ink cartridges, printhead cleaning cartridges, and the printhead cleaning container.

The printer's main features

Your printer is a color inkjet printer designed for printing high-quality images on flexible substrates from 0.584 m (23 in) to 2.64 m (104 in) wide. Some major features of the printer are shown below:

- Printing speeds in draft mode of up to 70 m²/h (753 ft²/h).

- Environmentally friendly, odorless, aqueous latex inks in six colors

- No special ventilation required, no hazardous waste

- 775 ml ink cartridges

- Print on a wide range of substrates—including most low-cost, uncoated, solvent-compatible substrates

- A range of HP recyclable substrates is available

- Durable prints with outdoor display permanence up to three years unlaminated, five years laminated

- Accurate and consistent color reproduction with automatic color calibration (built-in spectrophotometer) for most substrates

To send print jobs to your printer, you will need Raster Image Processor (RIP) software, which should be run on a separate computer. RIP software is available from various different companies; it is not provided with the printer.

The printer's main components

The following views of the printer illustrate its main components.

Front view
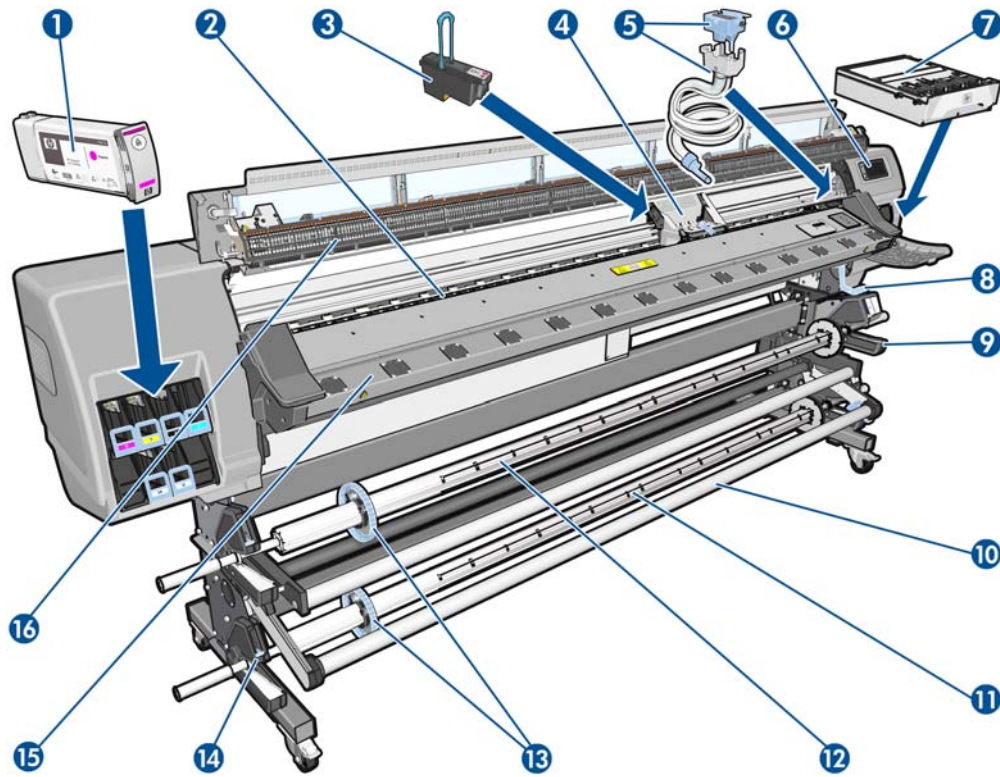
1. Ink cartridge
2. Platen
3. Printhead
4. Printhead carriage
5. Ink funnel and ink tube assembly
6. Front panel
7. Printhead cleaning cartridge
8. Substrate-adjustment lever
9. Take-up reel motor
10. Tension bar
11. Spindle
12. Take-up reel
13. Spindle stop
14. Spindle lock lever
15. Curing module
16. Drying module

Rear view
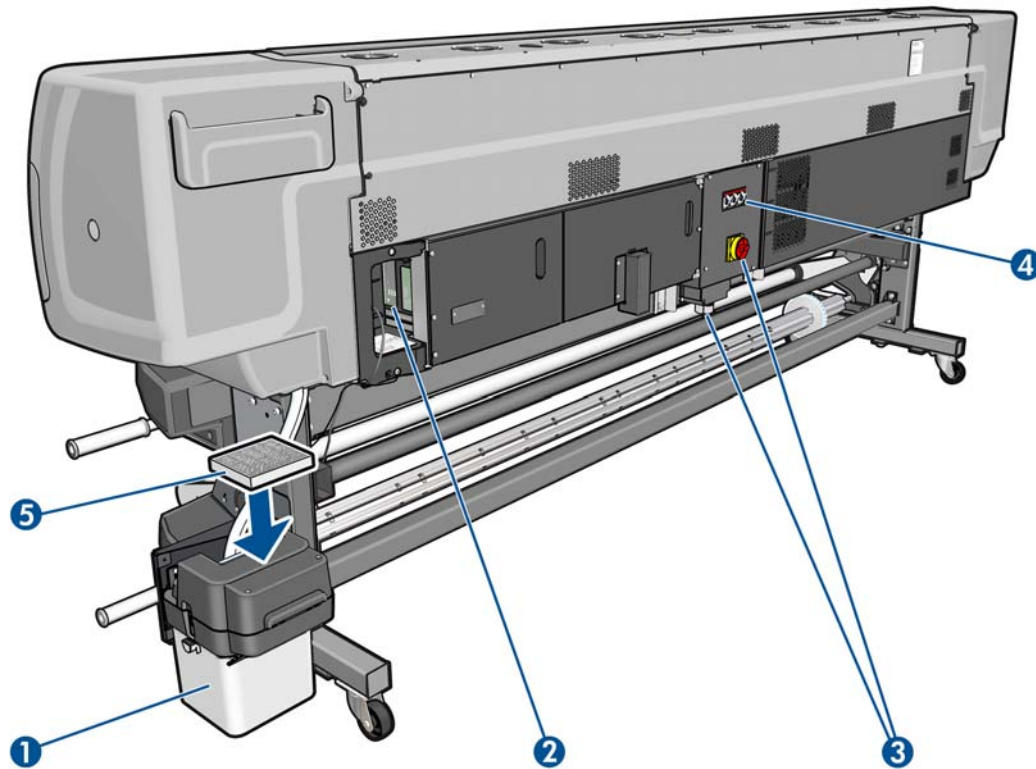
1. Printhead cleaning container

2. Sockets for communication cables and optional accessories

3. Power switch and power socket

4. Residual current circuit breakers for the heating components

5. Ink filter

Edge holders case
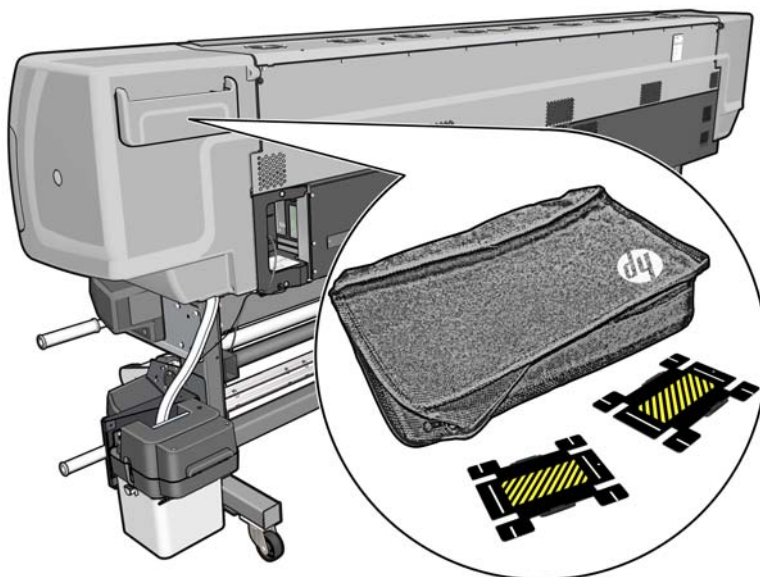
The case is normally attached to the rear of the printer, and contains the two edge holders when they are not in use.

Drying enclosure
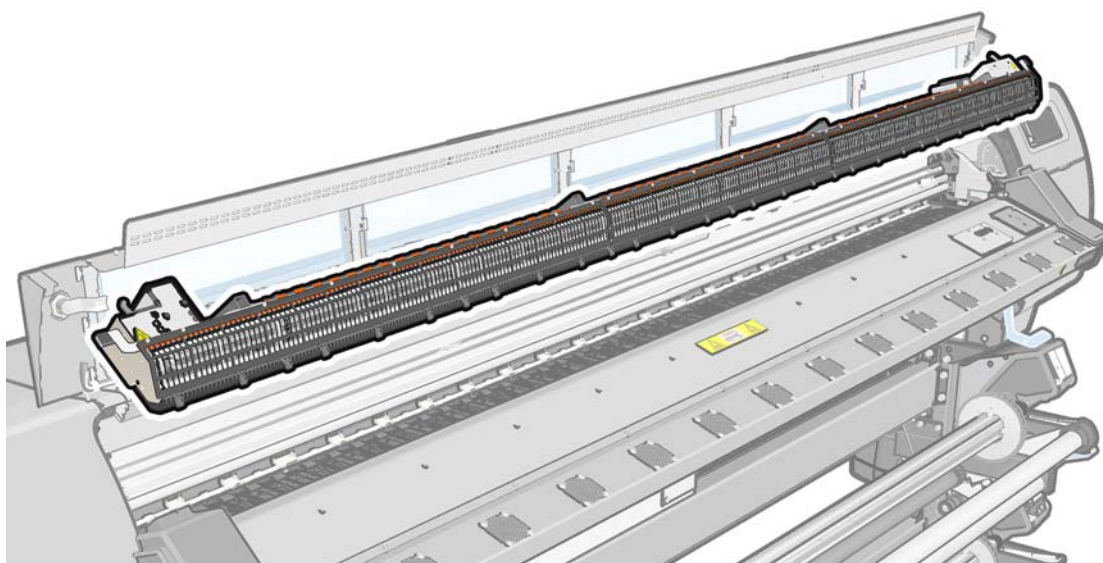
Take-up reel motor
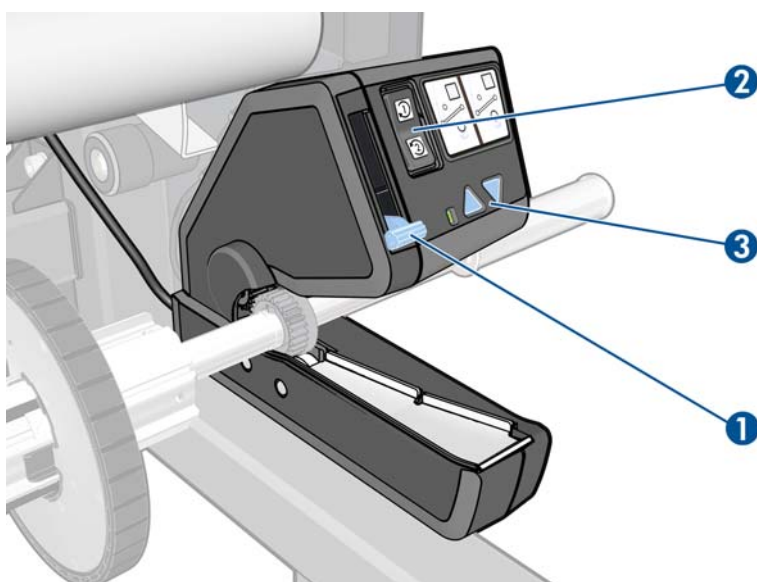
1. Take-up reel lever

2. Winding-direction switch

3. Manual winding buttons

Loading accessory
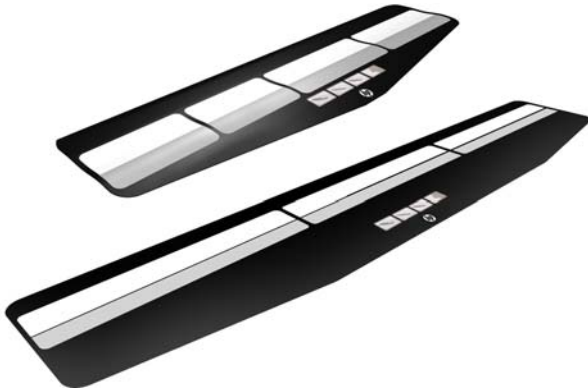
The loading accessory helps you to load some substrate types that are difficult to load without it. See The loading accessory on page 45.

The front panel

Your printer's front panel is located at the front right of the printer. It has the following important functions:

●   Assists you in troubleshooting issues

●   Is used when performing certain physical operations, such as unloading substrate and maintaining the printer

●   Displays information in brief about the status of the printer

●   Displays warning and error messages, when appropriate, along with audio alerts to call attention to a warning or message

The front panel has a large central area to display dynamic information and icons. On the left and right sides you can see up to six fixed icons at different times. Normally they are not all displayed at the same time.

Left and right fixed icons

●   Press 🏠 to return to the home screen.

●   Press ❓ to view this *User's guide* on the front panel.

●   Press ◁ to go to the previous item.

●   Press ▷ to go to the next item.

- Press ⟵ to go back to the previous screen. This does not discard any changes made in the current screen.

- Press ✖ to cancel the current process.

Home screen dynamic icons

The following items are displayed only on the home screen.

- Press 🛈 to view information about printer status, change printer settings, or initiate actions such as loading substrate or replacing ink supplies. A smaller warning icon appears if there are actions that need to be performed.

- To the right of the above button is a message showing the printer status or the most important current alert. Press this message to see a list of all current alerts, with an icon indicating the severity of each alert.

- Press 📄 to view information about the job that is currently printing.

- Most of the central part of the screen is divided into four parts, summarizing the state of the ink cartridges, the substrate, the printheads and printhead cleaning kit, and the network. For more information on any of these, press that part of the screen.

If the printer is left idle for some time, it goes into sleep mode and switches off the front-panel display. To change the time that elapses before sleep mode, press 🛈, then 🔧, then **Setup** > **Front panel options** > **Sleep mode wait time**. You can set a time between 1 and 240 minutes.

The printer wakes from sleep mode and switches on the front-panel display whenever there is some external interaction with it.

Information about specific uses of the front panel can be found throughout this guide.

The Embedded Web Server

The Embedded Web Server is a Web server running inside the printer. You can use it to obtain printer information, manage settings and presets, align printheads, upload new firmware and troubleshoot problems. Service engineers can use it to retrieve internal information that helps to diagnose printer problems.

You can access the Embedded Web Server remotely by using an ordinary Web browser running on any computer. See Access the Embedded Web Server on page 17.

The Embedded Web Server window displays three separate tabs. Buttons near the top of each page provide access to online help and supplies reordering.
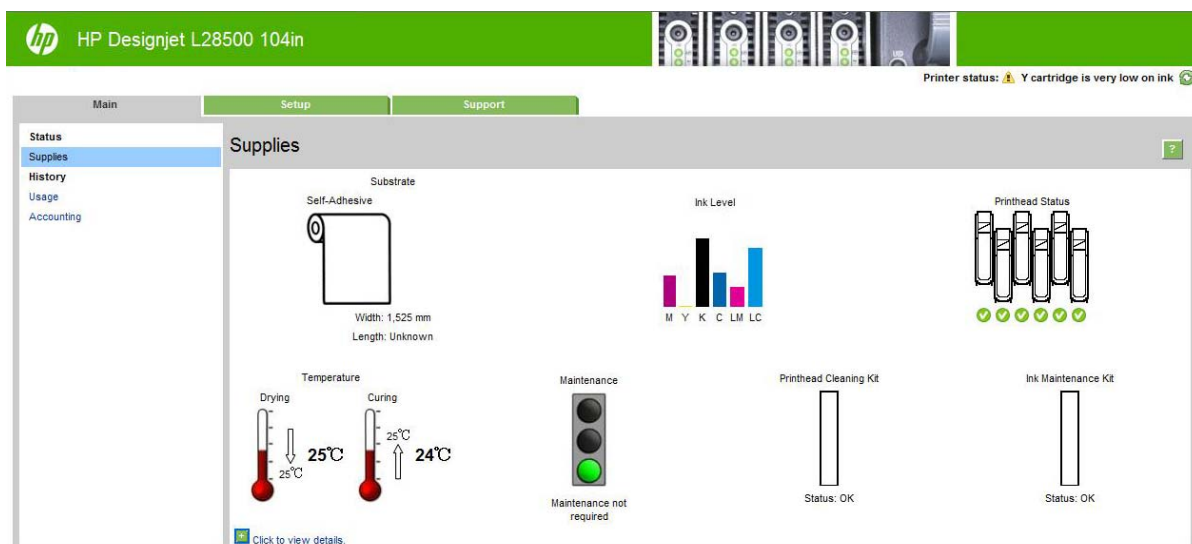
Main tab

The **Main** tab provides information about the following items.

- Substrate, ink, printhead and maintenance status

- Temperatures of the drying and curing modules

- Substrate and ink usage and accounting

Setup tab

The **Setup** tab enables you to complete these tasks.

- Specify printer settings such as units of measurement and refresh date

- Specify network and security settings

- Set the date and time

- Update firmware

- Align printheads

- Upload media presets

- Sign up for the Customer Involvement Program and configure your participation

Support tab

The **Support** tab offers various kinds of help with your printer.

- Browse helpful information from a variety of sources

- Troubleshoot problems

- Access HP Designjet links for technical support with your printer and accessories

- Access service support pages that show current and historical data on the usage of your printer

Turn the printer on and off

To turn on the printer, ensure that the residual current circuit breakers are in the up position and the power switch at the rear of the printer is turned on. If the printer does not start automatically, press the Power button on the front panel.

You can leave the printer on without wasting energy. Leaving it on improves response time. When the printer has not been used for a certain period of time, it saves power by going into sleep mode. Any interaction with the printer returns it to active mode, and it can resume printing immediately.

If you want to turn the printer on or off, the normal and recommended method is to use the Power button on the front panel.
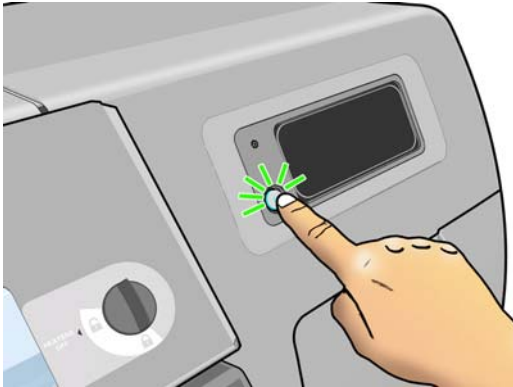
When you turn off the printer this way, the printheads are automatically stored with the printhead cleaning cartridge, which prevents them from drying out.

However, if you plan to leave the printer turned off for a long period of time, you are recommended to turn it off using the Power button, and then also turn off the power switch at the rear.
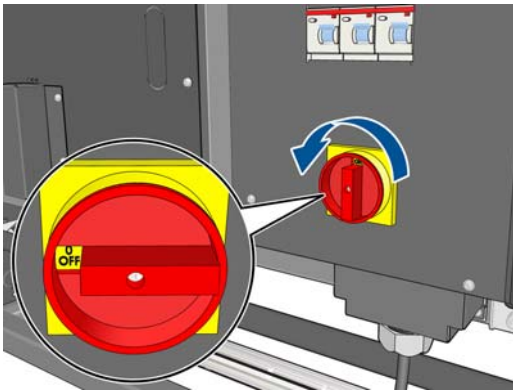
To turn it back on later, use the power switch at the rear. If the printer does not start automatically, press the Power button on the front panel.

When the printer is turned on, it takes about 5 minutes to initialize itself.

Restart the printer

In some circumstances you may be advised to restart the printer. To do so, press the Power button on the front panel to turn the printer off. Wait a few moments, then press the Power button again. This should restart the printer.

If the printer fails to restart, try the following alternative procedure.

1. Turn off the printer by using the power switch at the rear of the printer. Check that the residual current circuit breakers are in the up position.

2. Wait for 10 seconds.

3. Turn on the printer by using the power switch.

4. Make sure that the Power light on the front panel illuminates. If it does not, use the Power button to turn on the printer.

2   Connectivity and software instructions

Connection method

Your printer can be connected in the following way.

Connection type	Speed	Maximum cable length	Other factors
Gigabit Ethernet	Fast; varies according to network traffic	Long (100 m=328 ft)	Requires extra equipment (switches)

NOTE: The speed of any network connection depends on all the components that are used in the network, which can include network interface cards, hubs, routers, switches, and cables. If any one of these components cannot operate at high speed, you will have a low-speed connection. The speed of your network connection can also be affected by the total amount of traffic from other devices on the network.

Connect to a network

Before you begin, check your equipment:

● The printer should be set up and turned on.

● The Gigabit switch or router should be on and functioning correctly.

● All computers on the network should be turned on and connected to the network.

● The printer should be connected to the switch.

When the printer is connected to the network and turned on, you should see the printer's IP address appear on the front panel (12.34.12.34 in this example). Make a note of the IP address: you can use it later to access the Embedded Web Server.

If you see this screen without the IP address, either the printer is not successfully connected to the network, or your network has no DHCP server. In the latter case, you will have to set the IP address manually: see The printer cannot get an IP address on page 145.

Refer to the RIP instructions (not provided by HP) to install the software RIP.

3 Basic setup options

Printer setup options

Change the language of the front panel

Two methods are available to change the language that is used for the front-panel menus and messages.

- If you can understand the current front panel language, go to the front panel and press [icon], then [icon], then **Setup** > **Front panel options** > **Language**.

- If you cannot understand the current front panel language, start with the printer turned off. Turn it on. As soon as icons appear on the front panel, press [icon] followed by [icon]. The front panel blinks briefly.

Whichever method you used, the language selection menu should now appear on the front panel.
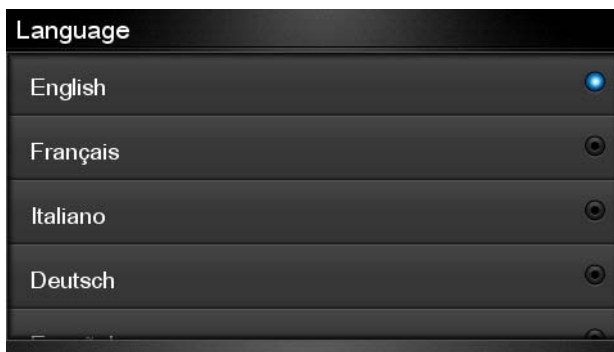
Highlight your preferred language, then press the OK button.

View or set the date and time

To view or set the printer's date and time, go to the front panel and press [icon], then [icon], then **Setup** > **Front panel options** > **Date and time options**.

Set altitude

If your printer is operating at a significant altitude above sea level, go to the front panel and press [icon], then [icon], then **Setup** > **Select altitude**, to tell the printer its operating altitude.

Request e-mail notification of specific error conditions

1. In the Embedded Web Server (see), go to the E-mail server page on the **Setup** tab and ensure that the following fields are correctly filled in:

- **SMTP server**. This is the IP address of the outgoing mail server (Simple Mail Transfer Protocol [SMTP]) that processes all e-mail messages from the printer. If the mail server requires authentication, e-mail notifications will not work.

- **Printer e-mail address**. Each e-mail message that the printer sends must include a return address. This address does not need to be a real, functional e-mail address, but it should be unique, so that recipients of the message can identify the printer that sent it

2. Go to the Notification page, which is also on the **Setup** tab.

3. Click the **New** icon to request new notifications, or click the **Edit** icon to edit notifications that have already been set up. Then specify the e-mail addresses to which notifications are sent, and select the incidents that result in notification messages.

Change the warming duration

When there are no more jobs to print, or you want to pre-warm the printer (**Prepare printing** option in the RIP), the printer´s drying and curing heaters remain on for the specified time and temperature in case another job arrives or in case you need to avoid any print-quality problem that could be caused by an incorrect temperature in the print zone. To choose the temperatures and how long you need the heaters to continue working in this situation, go to the front panel and press , then , then **Substrate** > **Substrate handling options** > **Warming temperature [45–55]** ºC and/or **Warm-up duration [5–120] min**.

Change the sleep mode setting

If the printer is left turned on but unused for a certain period of time, it automatically goes into sleep mode to save power. The default period of time it waits is 30 minutes. To change the time the printer waits before it goes into sleep mode, go to the front panel and press , then , then **Setup** > **Front panel options** > **Sleep mode wait time**. Enter in minutes the wait time that you want, then press **OK**.

Turn audio alerts on or off

To turn the printer's audio alerts on or off, go to the front panel and press , then , then **Setup** > **Front panel options** > **Enable audio alert** or **Disable audio alert**. By default, audio alerts are enabled.

Change the front panel display brightness

To change the brightness of the front-panel display, press , then , then **Setup** > **Front panel options** > **Display brightness**, then select a value by moving the scroll bar. Press **OK** to save the value.

Change the units of measurement

To change the units of measurement that appear on the front panel, press , then , then **Setup** > **Front panel options** > **Unit selection**, then **English** or **Metric**.

The units of measurement can also be changed in the Embedded Web Server.

Restore factory settings

To restore the printer settings to their original values as set in the factory, go to the front panel and press , then , then **Setup** > **Resets** > **Restore factory settings**. This option restores all of the printer settings except the Gigabit Ethernet settings.

Embedded Web Server setup options

Access the Embedded Web Server

Use the Embedded Web Server to view printer information remotely through an ordinary Web browser running on any computer.

The following browsers are known to be compatible with the Embedded Web Server:

- Internet Explorer 6 and later for Windows

- Safari 2 and later for Mac OS X

- Mozilla Firefox 2 and later

- Google Chrome 7

To use the Embedded Web Server on any computer, open your Web browser and type the printer's IP address in the browser's address bar. The printer's IP address appears on the front panel's home screen (12.34.12.34 in this example):

If you follow these instructions but fail to open the Embedded Web Server, see .

Change the language of the Embedded Web Server

The Embedded Web Server functions in the following languages: English, Portuguese, Spanish, Catalan, French, Italian, German, Simplified Chinese, Traditional Chinese, Korean, and Japanese. It uses the language that you specified in your Web browser options. If you specify a language that it cannot support, it functions in English.

To change the language, change your Web browser's language setting. For example, in Internet Explorer version 6, go to the **Tools** menu and select **Internet Options** > **Languages**. Make sure that the language you want is at the top of the list in the dialog box.

To complete the change, close and reopen your Web browser.

Restrict access to the printer

From the Embedded Web Server, you can select **Setup** > **Security** to set an administrator password. Once set, this password must be given in order to perform the following printer functions.

- Change printer settings.

- Update the firmware.

- Change the printer's date and time.

- Clear accounting information.

For more information, see the Embedded Web Server's online help.

If you forget the administrator password, you can delete the current password from the front panel: press
[icon] , then [icon] , then **Setup** > **Connectivity** > **Advanced** > **Embedded Web Server** > **Reset EWS password**.

Join the Customer Involvement Program

Join the Customer Involvement Program (CIP) and help us create better products for you. The printer usage
data that we collect will help us determine how you use your printer, and which product features are the
most important to you. All data is collected and used in accordance with the HP Privacy Policy. There are no
mandatory surveys or follow-up emails. No personal contact information is collected. You can stop
participating at any time.

Customer Involvement Program participation is configured with the Embedded Web Server, in particular the
AutoSend page of the **Setup** tab, which looks like this.
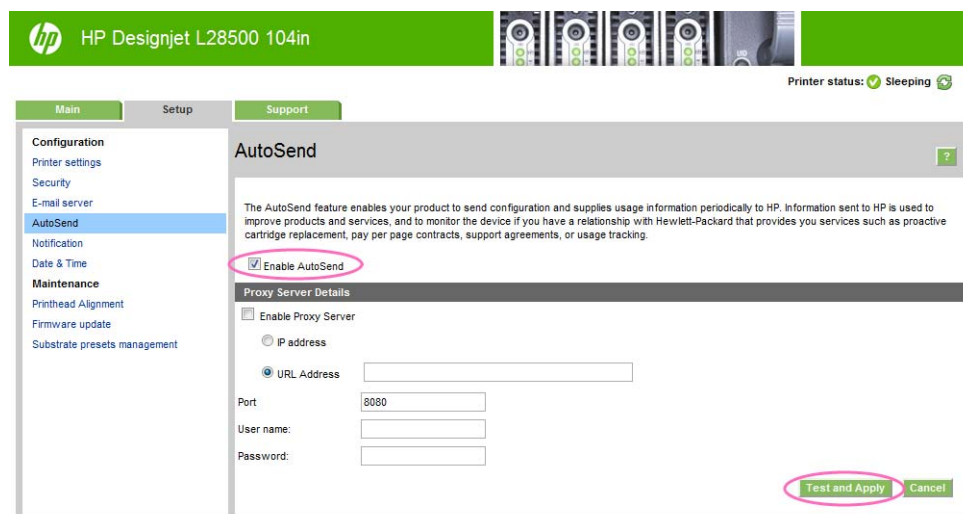
To sign up for the CIP, perform the following configuration steps.

1. Check the **Enable AutoSend** box. This is the main control for the CIP program. If it is checked you may be
participating, depending on the rest of the configuration. If it is unchecked, you are not.

2. Click the **Test and Apply** button in the lower right corner of the screen. After a while you will see the
result of the test in a window like the following:
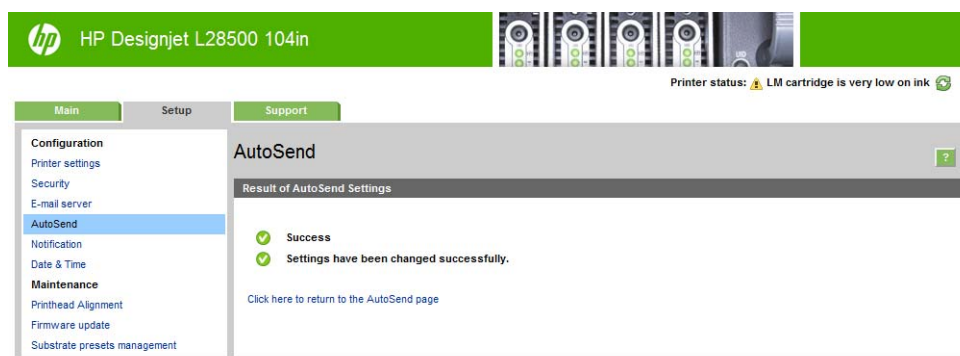
3. If the first message in the Result of AutoSend Settings window is **Success** and all items have a green
check mark in front of them, as shown above, then the configuration is complete. At this point you can
browse to another tab of the Embedded Web Server, or close your browser window.

If the message is anything else, for instance **Partial Success**, and there are red cross marks in front of
any items, then you may need to configure a proxy server: an 'intermediary' computer which sits in
between your printer and the Internet, and can 'talk' to both. The resulting window may look like this.
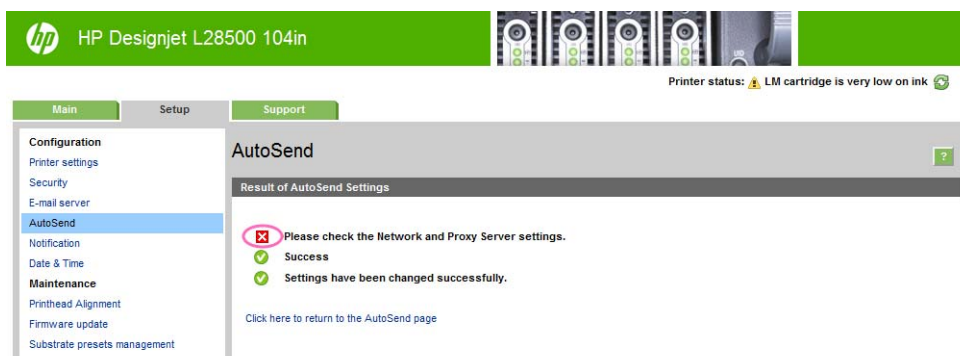
Return to the AutoSend page, and perform the following steps:

a. Enable (check) the **Enable Proxy Server** box in the lower part of the window.

b. If you know the URL of your proxy server (for example, **http://proxy.mycompany.com**; ask your network administrator or IT staff), select the **URL Address** button and enter the URL in the corresponding box. If you know the IP address of your proxy server (for example, **192.0.0.1**), select the **IP address** button and enter the address into the corresponding boxes.

c. Enter the proxy port in the **Port** box; the value is site-specific, but usually it is port 80.

d. User name and password may be required for some proxy servers; if so, enter them into the corresponding boxes. If you're not sure, leave these fields empty.

For example, the AutoSend tab page might now look like this.
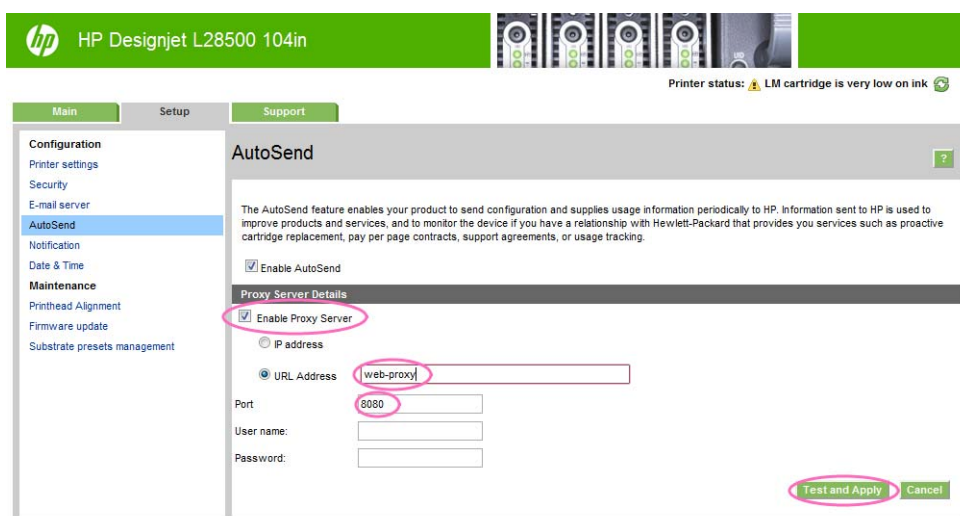
4. Click the **Test and Apply** button in the lower right corner of the screen. If the first message in the Result of AutoSend Settings window is **Success** and all items have a green check mark in front of them, then the configuration is complete. At this point you can browse to another tab of the Embedded Web Server, or close your browser window. If any items have a red cross mark in front of them, you may have to check and correct your proxy settings, as above.

4 Handle the substrate

Overview

You can print on a wide variety of printing materials, all of which are referred to in this guide as substrates.

Substrate tips

Choosing the correct substrate for your needs is an essential step in ensuring good print quality.

Here are some tips about substrate usage.

- Allow all substrates to adapt to room conditions, out of the packaging, for 24 hours before using them for printing.

- Handle film and photo substrates by the edges, or wear cotton gloves. Skin oils can be transferred to the substrate, leaving fingerprint marks.

- Keep the substrate tightly wound on the roll throughout the loading and unloading procedures. To make sure that the roll stays tightly wound, consider using tape to stick the leading edge of the roll to the core just before removing the roll from the printer. You can keep the roll taped during storage. If the roll starts to unwind, it can become difficult to handle.

  NOTE: The use of tape to stick the leading edge of the roll to the core is especially important for heavy substrates, because the inherent stiffness of the substrate can cause it to loosen and unwind from the core.

- Using the take-up reel with some substrates, such as textiles, may give the printer better control of the substrate and is likely to improve print quality.

- Print quality could be impaired if you use a substrate that is unsuitable for your image.

- Make sure that the appropriate print-quality setting is selected in the RIP.

- Whenever you load a roll, the front panel prompts you to specify the substrate family that you are loading. For good print quality, it is essential to specify this correctly. Check that the substrate belongs to the family named on the front panel, and check also that it matches the substrate profile in the RIP.

- If the substrate family shown on the front panel does not correspond to the substrate that you have loaded, take one of the following actions:

  ○ Reload the roll into the printer and select the correct substrate family. See Unload a roll from the printer on page 35 and Load a roll into the printer (automatically) on page 28.

  ○ At the printer's front panel, press ![info icon], then ![tools icon], then **Substrate** > **Change loaded substrate**.

> 📝 **NOTE:** Substrate advance calibration is not performed automatically when the substrate family is changed from the front panel. To request the calibration manually, see Adjust the substrate advance on page 126.

- For more substrate tips, see Load a roll into the printer (automatically) on page 28 and Load a roll into the printer (manually) on page 31.

> ⚠️ **CAUTION:** Removing the substrate from the printer manually without using the front panel could damage the printer. Do this only when necessary to clear a substrate jam.

Supported substrate families

Substrate family	Description
Self-Adhesive	PVC films with adhesive on one side and a detachable liner. There are two main types classified by application purpose: calendered (for flat surfaces) and cast (for complex 3D curves). The film may have different finishes: white, transparent, reflective, or perforated. **Examples: HP Air Release Adhesive Gloss Cast Vinyl**, Avery MPI3000 (calendered), Avery MPI1005 (cast), 3M IJ-380 (cast)
Banner	Usually a polyester mesh coated with PVC. There are also recyclable versions to cover the same applications (green banners). Banners have a wide range of grammage and can be grouped into frontlit, backlit, and block-out categories. **Examples: HP Durable Frontlit Scrim Banner**, Ultraflex Normandy Pro, Verseidag banners
Textile	Textiles are usually made of polyester or cotton yarns. Some open textiles come with a removable liner to prevent the ink from passing through the substrate. Very stiff textiles (such as canvases) should preferably be loaded as "Low temp (incl. HP Photoreal)" substrate. The use of porous substrates without a liner is not recommended.
Film	Usually a polyester film, although there are other materials. Select this family setting for substrates that can resist temperatures over 95°C (200°F), otherwise load them as "Low temp (incl. HP Photoreal)" substrate. **Example:** Intelicoat SBL-7 Polyester Backlit Film
Synthetic Paper	Substrates manufactured using synthetic resins, mainly extruded from polypropylene (PP). They have characteristics similar to those of plastic film, but their appearance and properties are similar to regular paper made from wood pulp. **Example:** Ilford Omnijet Dry Glossy Portable Display Film
Paper-Aqueous	Light paper-based (cellulose) substrates with a coating compatible with water-based inks, or offset paper. These substrates are not compatible with solvent inks. Weight is usually around 100 g/m^2.
Paper-Solvent	Paper-based (cellulose) substrates with a top coating compatible with solvent inks. Weight is usually between 120 and 200 g/m^2. **Examples: HP Blue Back Billboard Paper**, Intelicoat GPIOF140, blue back substrates
Low temp (incl. HP Photoreal)	Substrates sensitive to high temperatures (PP, HDPE, PET thin films), and paper-based (cellulose) substrates with top coating that have a high stiffness and grammage (200 g/m^2 or higher). **Example: HP Photorealistic Poster Paper**
Mesh	An open and resistant polyester mesh coated with PVC and mainly used for building wrap applications. These substrates have a removable liner to prevent the ink from passing through the substrate. **Example:** Ultraflex Stripmesh

The HP Media Finder is a tool that allows you to search for substrates (HP and third-party) that have been tested and shown to be compatible with your printer. The tool allows searching by manufacturer brand, substrate type, application or geographical availability. It can be found at http://www.hp.com/go/latexmediafinder/.

Supported HP substrates

Substrate	Recycle	Take Back	FSC	Oeko
Banners				
HP HDPE Reinforced Banner		✖		
HP Double-sided HDPE Reinforced Banner		✖		
HP Durable Frontlit Scrim Banner				
Self-adhesive materials				
HP Air Release Adhesive Gloss Cast Vinyl				
HP One-view Perforated Adhesive Window Vinyl				
HP Permanent Gloss Adhesive Vinyl				
HP Permanent Matte Adhesive Vinyl				
Films				
HP Backlit Polyester Film		✖		
Fabrics				
HP Heavy Textile Banner		✖		●
HP Light Textile Display Banner		✖		●
Papers				
HP PVC-free Wall Paper (Greenguard, AgBB)			●	
HP White Satin Poster Paper	✖			
HP Photo-realistic Poster Paper	✖			
HP Blue Back Billboard Paper				
Specialty materials				
HP DuPont Tyvek Banner		✖		
HP Satin Canvas				

Key

✖	Recycle: Substrates that can be recycled through commonly available recycling programs.
✖	TakeBack: HP offers the HP Large-format Media TakeBack program in North America and Europe through which most HP recyclable substrates can be returned, availability varies. For details, visit http://www.hp.com/recycle/. Aside from this program, recycling opportunities for these products are currently only available in limited areas. Customers should consult local recycling resources for recycling these products.
FSC www.fsc.org FSC® C017543 The mark of responsible forestry	FSC-certified papers carry the Forest Stewardship Council (FSC) Mixed Sources label, signifying that these substrates support the development of responsible forest management worldwide. The wood comes from FSC-certified well-managed forests, company-controlled sources and/or recycled material.

CONFIDENCE IN TEXTILES Tested for harmful substances according to Oeko-Tex® Standard 100 10.HUS.76357 Hohenstein	Unprinted HP Heavy Textile Banner, HP Light Textile Display Banner and HP Wrinkle-free Flag with Liner are Oeko-Tex-certified according to Oeko-Tex Standard 100, which is a globally uniform testing and certification system for textile raw materials, intermediate and end products at all stages of production. Tested for emissions of chemicals such as pesticides, allergy-inducing dyestuffs or tin-organic compounds.
Greenguard	HP PVC-free Wall Paper printed using HP Latex Inks is listed in the GREENGUARD product list of low-emitting products and is tested to the GREENGUARD Children & Schools standard. The print is neither GREENGUARD nor GREENGUARD Children & Schools Certified. The GREENGUARD Environmental Institute is an American National Standards Institute (ANSI) authorized standards developer that establishes acceptable indoor air standards for indoor products, environments, and buildings. See http://www.greenguard.org/.
AgBB	The Committee for Health-related Evaluation of Building Products, AgBB, establishes the fundamentals for a uniform and reproducible health-related evaluation of building products in Germany, including criteria for testing and an evaluation scheme for health-related evaluation of volatile organic compound (VOC) emissions from building products used for application indoors.

Porous substrates

Substrates of limited porosity may be used with this printer, but very porous substrates could damage the printer.

To check the porosity of your substrate, proceed as follows.

1.   If the printer has any substrate loaded, unload it.

2.   Cut a piece of self-adhesive vinyl white gloss 15 × 50 mm (0.6 × 2 in) in size.

3.   Stick it to the platen as shown.

4.   Load the substrate that you want to check.

5.   Open your RIP software.

6.   Download the test file from inside the printer: **http://***printerIP***/hp/device/webAccess/images/ Ink_trespassing_check.pdf**, where *printerIP* is the IP address of your printer.

7.   Print the test file using the number of passes and media preset that you intend to use in future with this substrate (or a similar profile in terms of ink limit).

8.   Unload the substrate.

9. Remove the strip of self-adhesive vinyl from the platen.

10. Look at the self-adhesive vinyl you have taken from the platen.

- If the strip is completely white (has no ink on it), the tested substrate is non-porous and can be used for printing as described in this guide.

- If the strip is significantly non-white (as in the above example), the tested substrate is porous and should not be used with this printer.

- If the strip is lighter in color than PANTONE 427C, the tested substrate may be used for short print runs.

NOTE: Printing on porous substrates can cause a decrease in print quality that would require a service repair not covered by your warranty.

11. Clean the platen: see Clean the platen on page 97.

Load a roll onto the spindle

TIP: As an alternative to the description here, you can see an animation of this process in the front panel: press ![info icon], then ![wrench icon], then **Substrate** > **Substrate load** > **Learn how to load spindle**.

1. Make sure that the printer wheels are locked (the brake lever is pressed down) to prevent the printer from moving.

2. If the tension bar is in its upper position, lower it by lifting the lever.
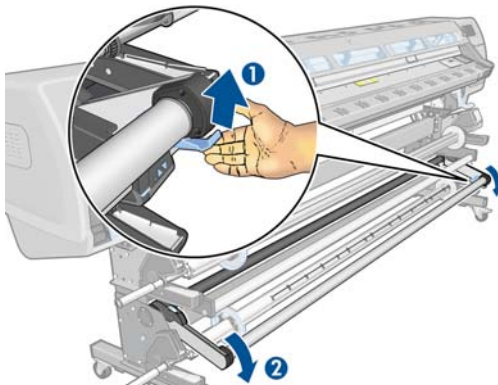
3. Lift the spindle lock lever to disengage the spindle.
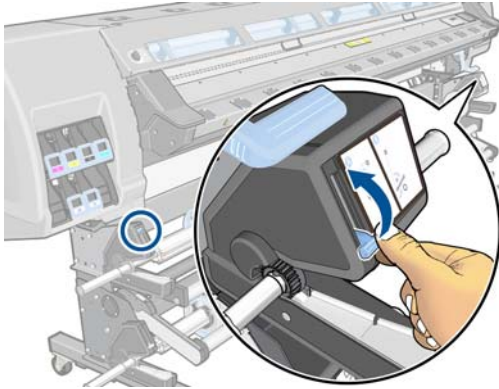
4. Remove the spindle from the printer.

⚠ **CAUTION:** Do not insert your fingers into the spindle supports.
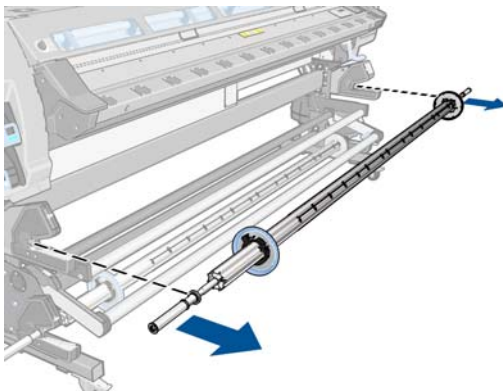
The spindle has a stop at each end to keep the roll in position. Remove the blue stop at the left end to mount a new roll (the stop at the other end can also be removed, if you wish). The stop slides along the spindle to hold rolls of different widths.

5. Unlock the blue stop.

6. Remove the stop from the left end of the spindle.
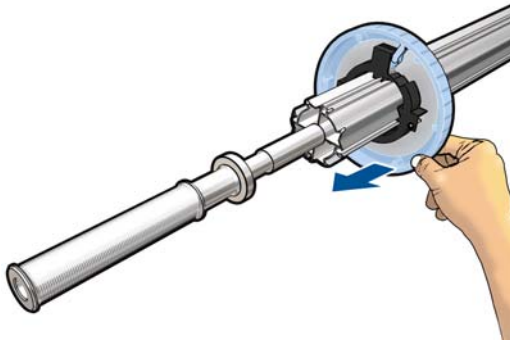
7. Slide the spindle into the roll. If the roll is long and heavy, you may need two people to handle it.
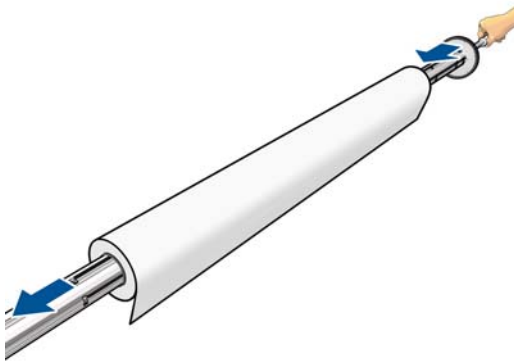
8. The right stop of the spindle has two positions: one for rolls of the printer's maximum width, and another for narrower rolls. Remember to use the second position for narrower rolls, which improves the drying process and allows higher printing speeds.
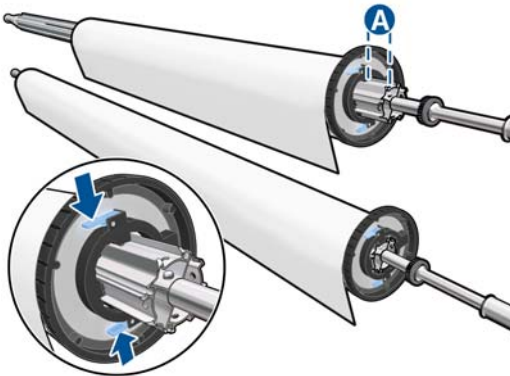
9. Put the blue stop on to the upper end of the spindle, and push it towards the end of the roll.
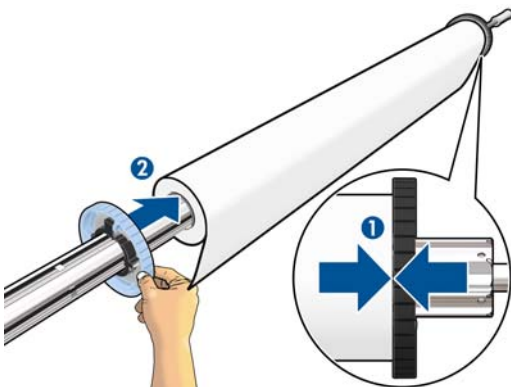
10. Lock the blue stop when it is in contact with the substrate.
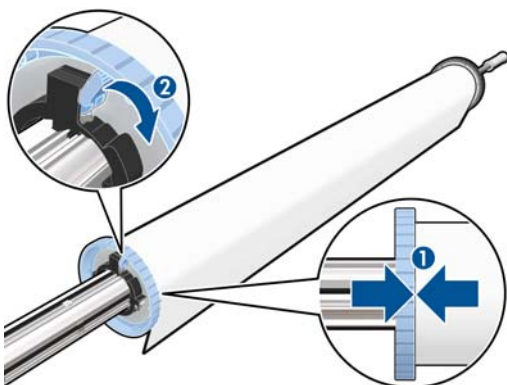
11. Ease the spindle into the printer.
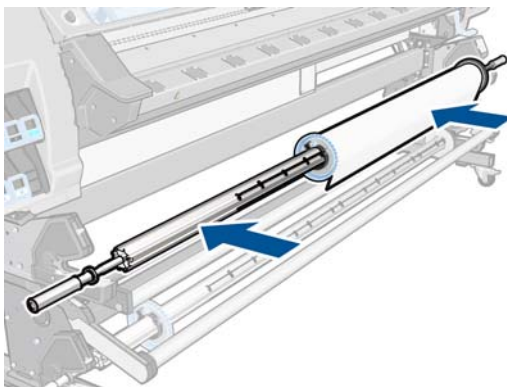
If you regularly use different substrates, you can change rolls more quickly if you pre-load rolls of different substrates on different spindles. Extra spindles are available for purchase.

Load a roll into the printer (automatically)

To start this procedure, you need to have a roll loaded on the spindle. See .

The normal minimum substrate width is 23 inches (584 mm). To load substrates down to a minimum width of 10 inches (254 mm), go to the front panel and press [i], then [🔧], then **Substrate** > **Substrate handling options** > **Enable narrow substrate**. With this option, print quality is not guaranteed.

☀ **TIP:** To load a roll of textile material, see .

TIP: When loading very thin or very thick substrates, or substrates with a tendency to curl, you should follow the manual loading procedure to reduce the risk of substrate jams and printhead crashes; see Load a roll into the printer (manually) on page 31.

1. At the printer's front panel, press [i], then [🔧], then **Substrate** > **Substrate load** > **Load roll**.

Substrate load
Load roll
Manual load
Load with accessory
Learn how to load spindle
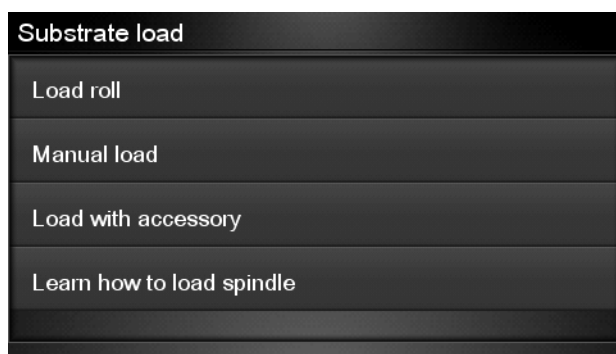
2. Carefully insert the leading edge of the substrate above the black-ribbed roller, making sure the substrate remains taut during the process. Avoid rewinding the substrate manually, unless the printer asks you to do so.
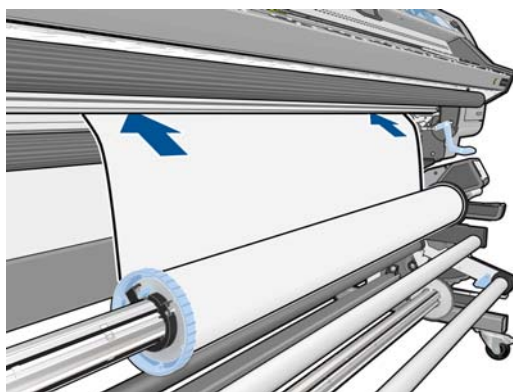
⚠ **WARNING!** Take care not to touch the rubber wheels on the platen while loading substrate. These wheels can rotate and trap skin, hair or clothing.

⚠ **WARNING!** Take care not to push your fingers inside the printer's substrate path.

The printer beeps when it detects and accepts the leading edge of the substrate.

3. The front panel may prompt you to remove the edge holders from the platen, if the printer believes they are present (it may be wrong: it has no sensor to detect them).

4. Select the type of substrate you are loading.

NOTE: You should select the name of the particular substrate that you are using in your RIP software, not in the front panel.

NOTE: The RIP substrate setting will overwrite the front panel setting.

5. You have the option of entering the length of substrate on the roll. If you choose to do so, the amount of substrate that is subsequently used is then tracked. See Substrate length tracking on page 51.

6. The printer checks the substrate in various ways and may ask you to correct problems with skew or tension.

NOTE: You can specify the maximum permitted amount of skew at the front panel: press ▣ , then ⚲ , then **Substrate** > **Substrate handling options** > **Max skew setting**.

7. Wait until the substrate emerges from the printer, as shown below.
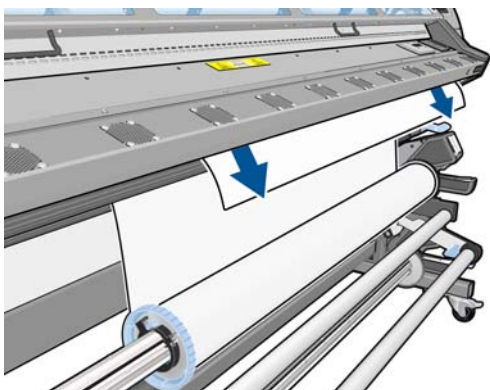
NOTE: If you have an unexpected problem at any stage of the substrate loading process, see The substrate cannot be loaded successfully on page 133.

8. If you are loading transparent substrate without opaque borders, you are asked to enter the width of the substrate and the distance of the right edge from the printer's side plate (as indicated by the ruler on the front of the curing module).

9. If you have chosen double-sided printing, the front panel may ask a question about it at this point.

10. The printer calibrates the substrate advance.

11. The printer indicates that it is ready for printing.

Take care not to cover the top fans.

For instructions on how to use the take-up reel, see The take-up reel on page 35.

Load a roll into the printer (manually)

The manual loading process should be used in the following cases:

●   The substrate is unusually thin or unusually thick.

●   The substrate has ragged edges.

●   The substrate tends to curl at the edges.

●   The printing side of the substrate faces outwards.

In other cases, the automatic loading process is recommended: see Load a roll into the printer (automatically) on page 28.

To start this procedure, you need to have a roll loaded on the spindle. See Load a roll onto the spindle on page 25.

The normal minimum substrate width is 23 inches (584 mm). To load substrates down to a minimum width of 10 inches (254 mm), go to the front panel and press [info], then [wrench], then **Substrate** > **Substrate handling options** > **Enable narrow substrate**. With this option, print quality is not guaranteed.

☀ **TIP:**   To load a roll of textile material see The loading accessory on page 45.

1. At the printer's front panel, press ![info icon], then ![wrench icon], then **Substrate** > **Substrate load** > **Manual load**.
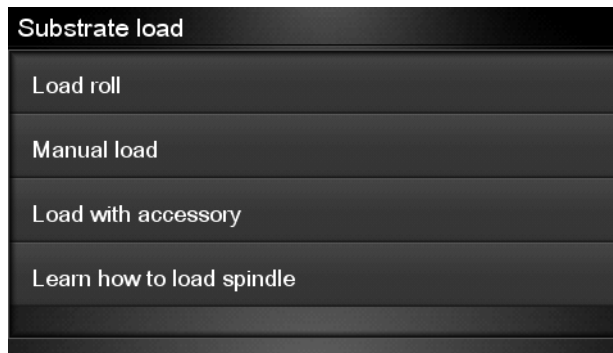
This step is optional: you can alternatively begin at step 2.

The front panel may prompt you to remove the edge holders from the platen, if the printer believes they are present (it may be wrong: it has no sensor to detect them).

2. Lift the substrate-adjustment lever as far up as it will go.
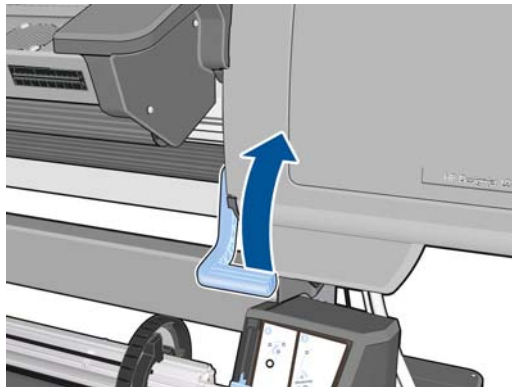
3. Carefully insert the leading edge of the substrate above the black-ribbed roller, making sure the substrate remains taut during the process. Avoid rewinding the substrate manually, unless the printer asks you to do so.

4. Continue to feed the substrate until it reaches the printing platen. Open the window to help pull the substrate through.

⚠ **WARNING!** Do not touch the printer's drying enclosure. Even after you have opened the window latch, which disconnects the power to the drying and curing modules, the internal surfaces could be hot.

✧ **TIP:** If the substrate you are using tends to curl, keep feeding the substrate until the edge is out of the printer. You are also recommended to use the take-up reel, or to disable the cutter from the front panel if not using the take-up reel.

5. Pull down the substrate-adjustment lever as far as it will go.
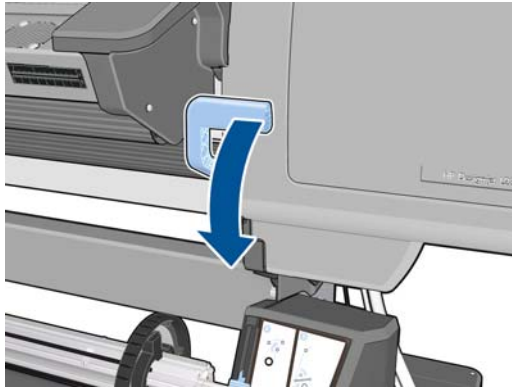
6. Select the type of substrate you are loading.

📝 **NOTE:** You should select the name of the particular substrate that you are using in your RIP software, not in the front panel.

💡 **TIP:** When loading very thin substrates, always select the substrate type as **Banner** to minimize the vacuum pressure applied while loading; when loading very thick substrates, always select the substrate type as **HP Photorealistic** to maximize the vacuum pressure. After loading and before printing, go to the front panel and change to the correct type for the substrate you are loading: press ![info icon], then ![wrench icon], then **Substrate** > **Change loaded substrate**.

TIP: When manually loading textile substrates that you intend to use with the take-up reel, before selecting the substrate type it is a good idea to use the **Move substrate** option in the **Substrate** menu to advance the substrate beyond the point where it may jam in the printer. This avoids the possibility of a substrate jam at this stage and also some other substrate issues; and it enables you to skip the normal check for skew.

7. The printer checks the substrate in various ways and may ask you to correct problems with skew or tension.

📝 **NOTE:** You can specify the maximum permitted amount of skew at the front panel: press ![info icon], then ![wrench icon], then **Substrate** > **Substrate handling options** > **Max skew setting**.

8. If you are loading transparent substrate without opaque borders, you are asked to enter the width of the substrate and the distance of the right edge from the printer's side plate (as indicated by the ruler on the front of the curing module).

9. If you have chosen double-sided printing, the front panel may ask a question about it at this point.

10. The printer calibrates the substrate advance.

11. The printer indicates that it is ready for printing.

Take care not to cover the top fans.
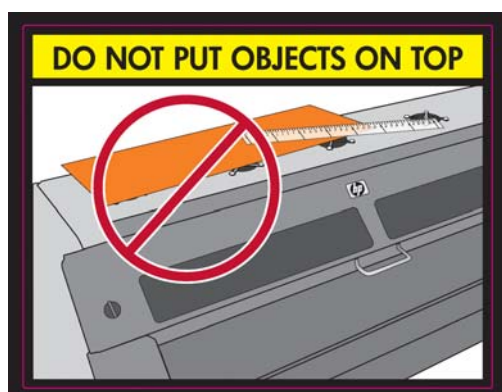
Load a cut sheet into the printer

The printer is designed to be used with rolls of substrate. It is possible to load cut sheets into the printer, but print quality cannot be guaranteed, and you may have some difficulty in avoiding skew.

● The sheet should be at least 1067 mm (42 in) long.

● Load the sheet by following the normal roll loading process (automatic or manual, depending on the substrate).

● During the loading process, the printer tries to detect the winding direction of the roll by turning the spindle in both directions. When the substrate is not attached to the spindle, the following message appears.
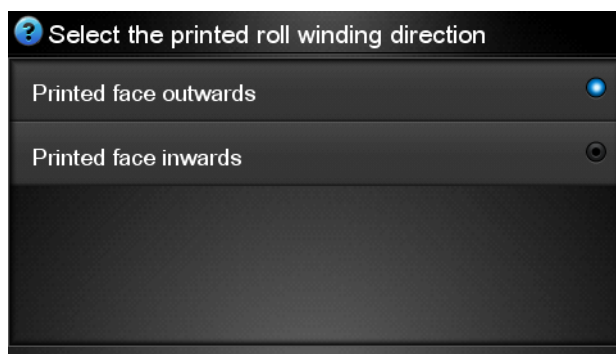
● A cut sheet is likely to be loaded with excessive skew, and the printer may not be able to correct it automatically. If the skew as measured by the printer exceeds 3 mm/m, you are recommended to stop

loading and try again. However, if the skew is tolerable, you can consider skipping the automatic skew correction. To do so, when prompted, choose **Continue with current skew**.

Unload a roll from the printer

1. If you used the take-up reel during printing, unload the printed roll from the take-up reel. See <u>Unload a roll from the take-up reel on page 42</u>.

2. On the printer's front panel, press ![info icon], then ![wrench icon], then **Substrate** > **Substrate unload** > **Unload roll**.

3. If the printer has been tracking the length of the substrate, the front panel displays the remaining length so that you can note it for future reference. See <u>Substrate length tracking on page 51</u>.

    ![Unloading roll dialog: Substrate remaining length: 11.58 m. Write down this value to track length accurately. Press OK to continue. OK]
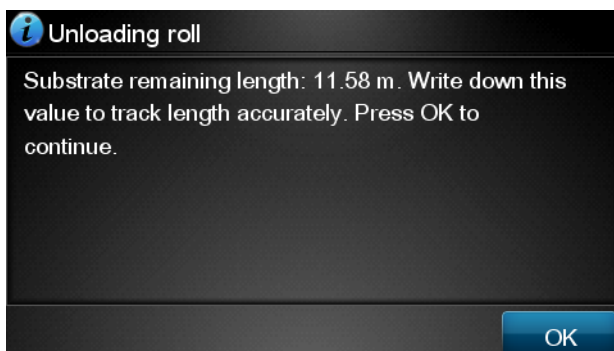
    Press **OK** to continue.

4. When the printer has rewound the roll, lift the spindle lock lever.

5. Remove the roll from the printer, pulling out the right end on the right side of the printer first. Do not insert your fingers into the spindle supports during the removal process.
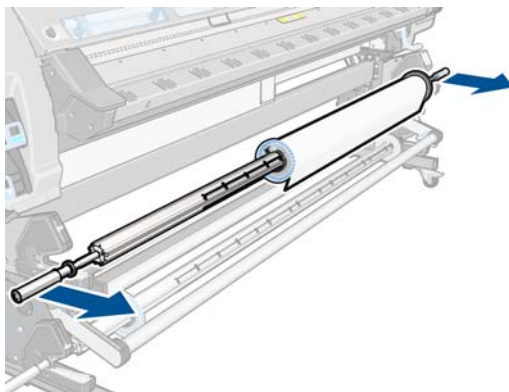
The take-up reel

The take-up reel must be enabled and operated from the front panel. When the take-up reel is enabled, the **Take-up reel enabled** message appears on the **Substrate** tab on the front panel. If the take-up reel is not enabled and you would like to enable it, press ![info icon], then ![wrench icon], then **Substrate** > **Enable take-up reel**. Press **Yes** to confirm, and follow the instructions on the front panel.

The tension bar

When in use, the take-up reel requires a dangling loop of substrate weighed down by the tension bar.
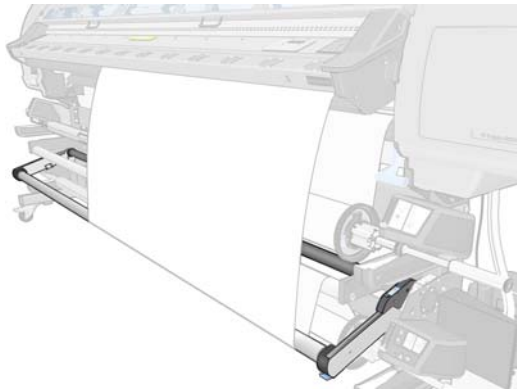
The tension bar has a counterweight to increase output tension. It can be set in one of two positions (in or out), depending on the substrate type.

With textile substrates only, it should be at the front.
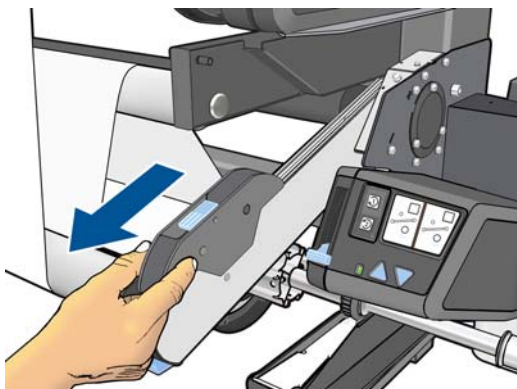
Load a roll onto the take-up reel

1. On the printer's front panel, press [info], then [wrench], then **Substrate** > **Enable take-up reel**.

2. The front panel offers you the choice of loading the take-up reel immediately, or during printing.

⚠ Substrate load

To maintain print quality, keep flexible substrate tense using take-up reel. Press Yes to attach it now or press No to load it during printing. Press Cancel to print without take-up reel.

| Yes | No |
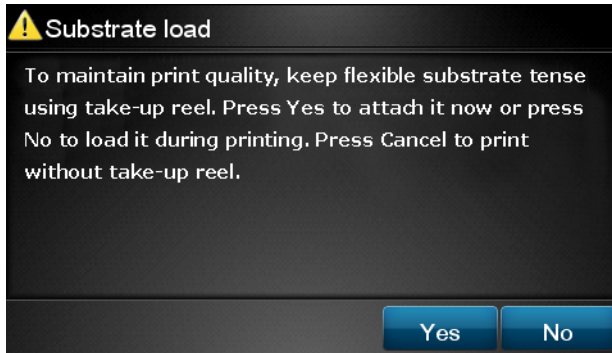
If you decide to load the take-up reel during printing, familiarize yourself with the procedural steps. Loading the take-up reel during printing requires you to complete the procedure while the printer is feeding and printing substrate. Loading the take-up reel during printing saves approximately 1.5 m (4.9 ft) of substrate.

☼ **TIP:** If you have already loaded the take-up reel, but the printer fails to recognize that it is loaded, you can save some time by selecting **Load it during printing**.

TIP: You are recommended to keep the take-up reel winding-direction switch in the off position (see) to avoid unwanted movements when loading the take-up reel while printing. Once you have the leading edge of the substrate attached to the core, and the substrate is straight, switch the winding-direction switch to position 1 or 2, as you prefer. Setting 1 winds the substrate so that the printed image faces in, setting 2 winds the substrate so that the printed image faces out.

The following steps assume that you have decided to load immediately. If you decide to load later, during printing, you must complete the same operations without guidance from the front panel.

3. Ensure that the tension bar is in its raised position (up).
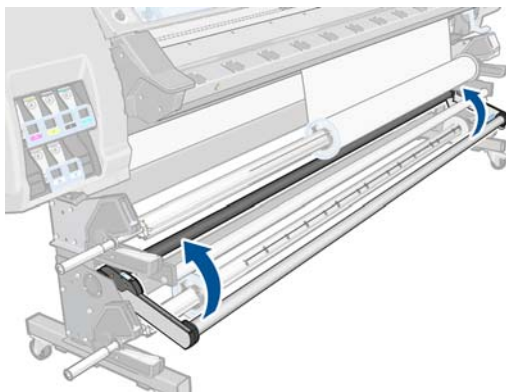
4. Unlock the take-up reel by lifting the two levers.
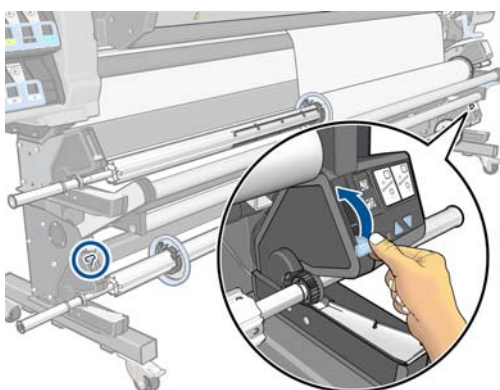
5. Remove the take-up reel.
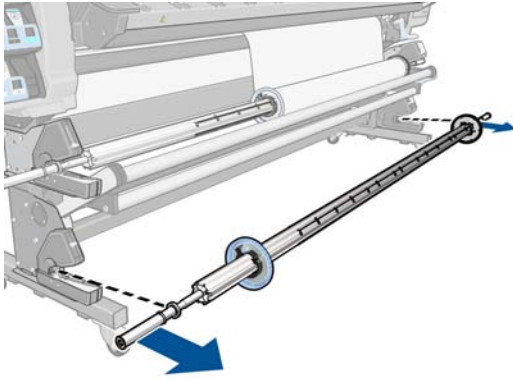
6. Unlock the blue stop.

7. Remove the stop from the left end of the spindle.
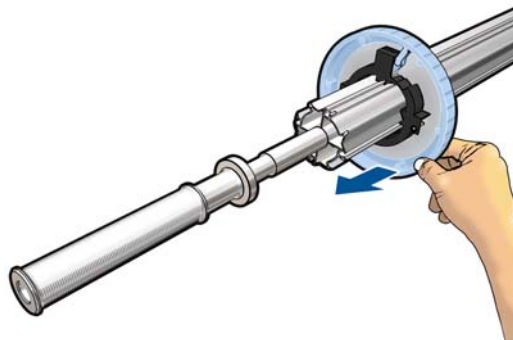
8. Load the core onto the take-up reel. The core should be at least as wide as the substrate.
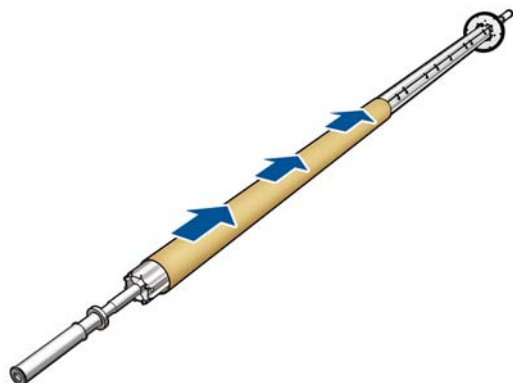
9. Replace the blue stop on the take-up reel. Slide it into contact with the core, then lock it.
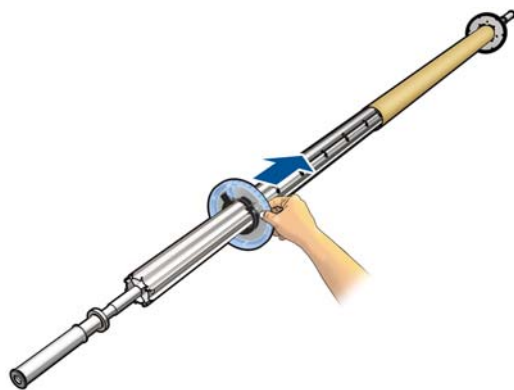
10. Load the take-up reel into the printer by pushing firmly on both ends.
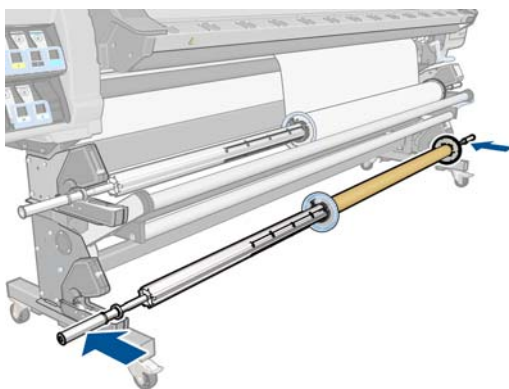
11. Use the **Move substrate** option in the front panel's **Substrate** menu to advance the substrate. Continue advancing the substrate until it reaches the spindle.
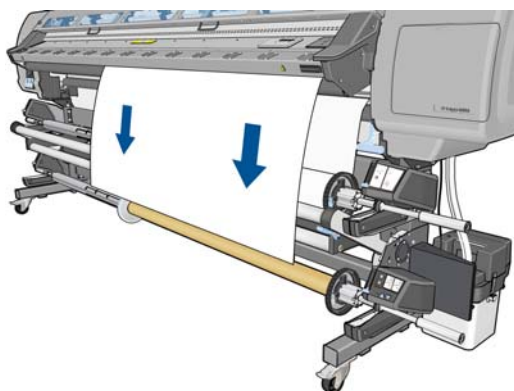
12. Pass the substrate between the diverter and the tension bar.
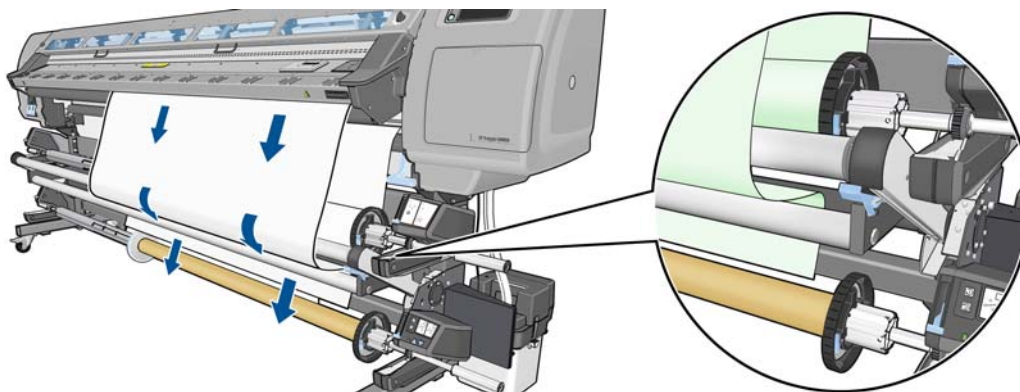
13. Pull down the center of the substrate's leading edge to straighten the substrate. Do *not* attempt to pull more substrate out of the printer.

> **NOTE:** If you are loading the take-up reel **during** printing you do not need to pull the substrate taut. Tape the substrate to the spindle core when an adequate length of substrate has fed from the printer after printing begins.
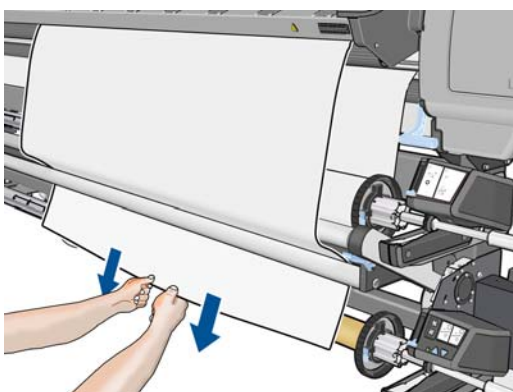
14. Ensure that the right-hand edge of the substrate is aligned with the right-hand stop on the take-up reel.
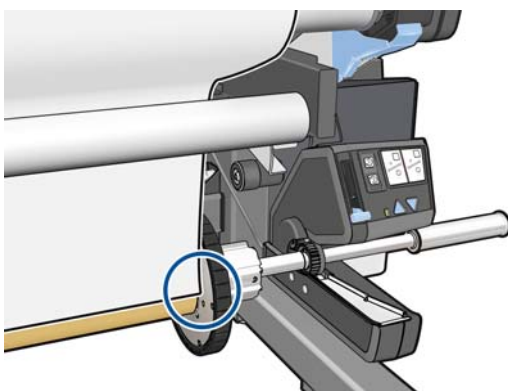
15. Tape the leading edge of the substrate to the core in the center, then at each side. Make sure that the substrate is straight.
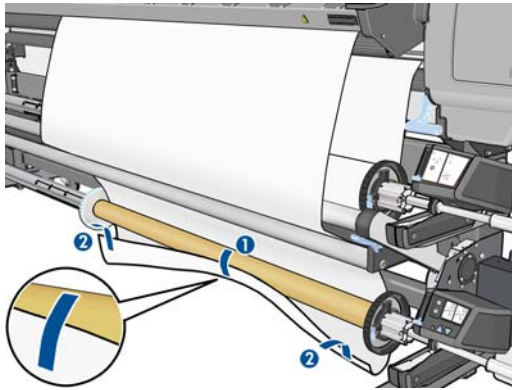
16. Use the advance button on the take-up reel motor to advance the take-up reel one turn, to make sure that the substrate is firmly attached to the core.
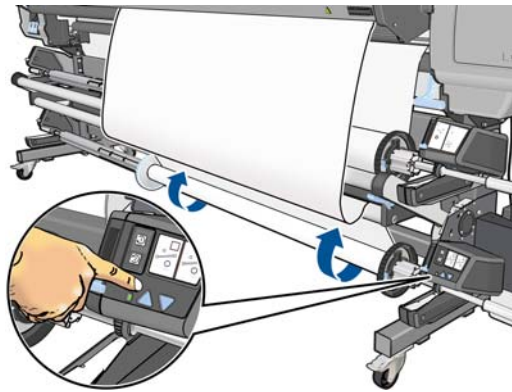
17. Press the OK button on the front panel. The printer advances the substrate.
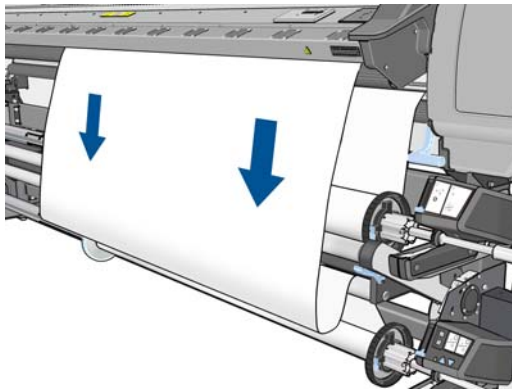
18. Lift the lever to lower the tension bar.
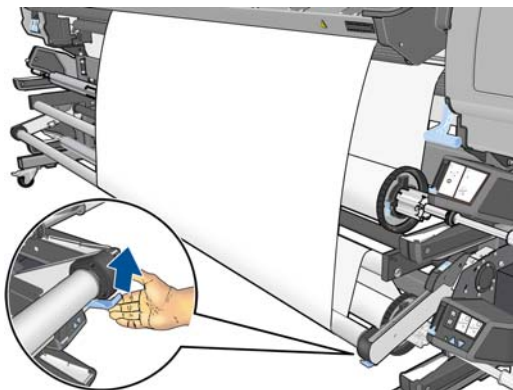
19. Use the winding-direction switch on the take-up reel motor to select the winding direction. Setting **1** winds the substrate so that the printed image faces in. Setting **2** winds the substrate so that the printed image faces out.
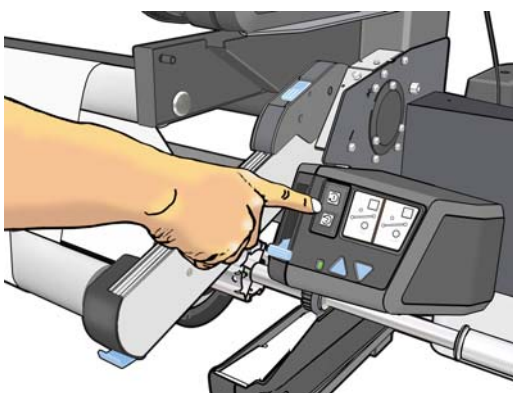
20. Press the OK button on the front panel. The **Take-up reel has been successfully installed** message appears.

21. The following image shows how the printer looks when it is operating. As substrate is fed from the printer, it drops down to the tension bar, over the diverter, then down again to the take-up reel.
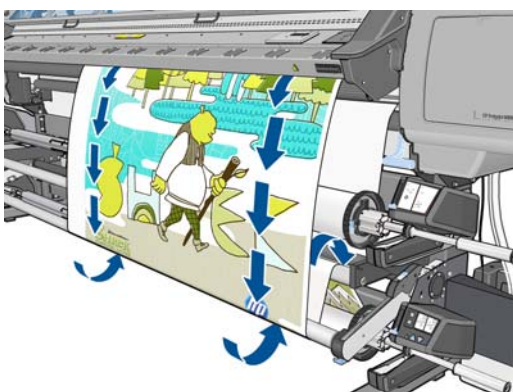
NOTE: The cutter is disabled when the take-up reel is in use.

Unload a roll from the take-up reel

1. On the printer's front panel, press , then , then **Substrate** > **Disable take-up reel**.

The printer advances the substrate to allow for cutting.

2. Switch the winding-direction switch to the off position. The switch is in the off position when it is centered (in other words, when the switch is neither in position 1 nor position 2).
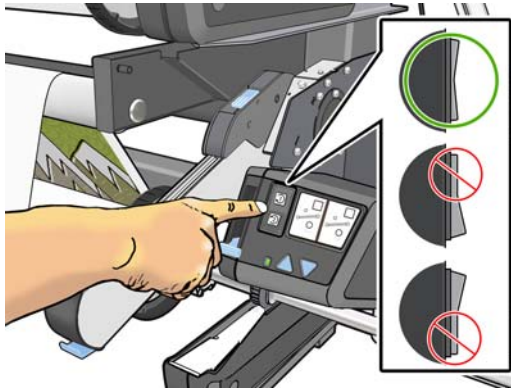
3. Raise the tension bar to its upper position.

4. Use the advance button on the take-up reel motor to wind the excess substrate around the take-up reel.
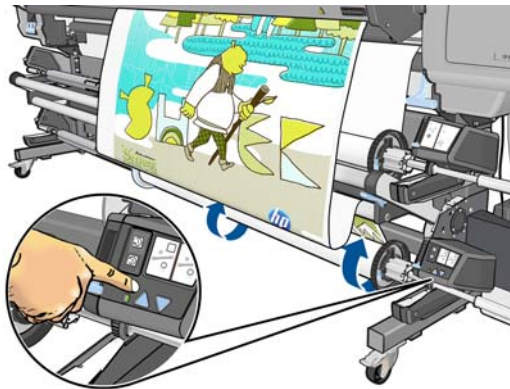
5. Press the OK button on the front panel. The printer asks you to cut the substrate manually.

6. Use the advance button on the take-up reel motor to wind the remainder of the substrate around the take-up reel.
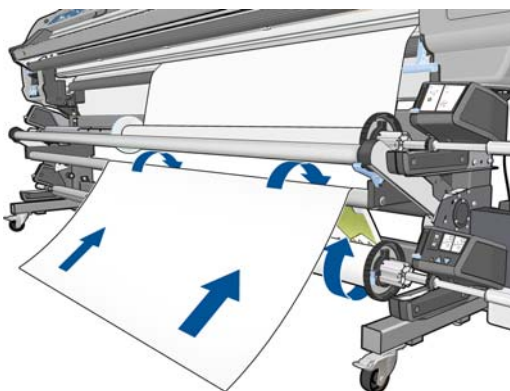
7. Press the OK button on the front panel.

    The front panel displays the amount of printed substrate that is on the take-up reel.

8. Unlock the take-up reel by lifting both levers.
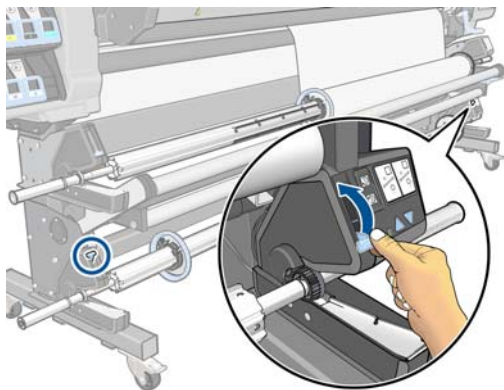
9. Remove the roll from the printer, pulling out the end on the right side of the printer first. Do not insert your fingers into the spindle supports during the removal process.
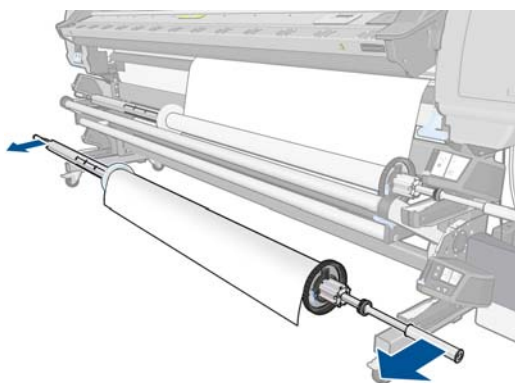
10. To remove the roll from the printer after you have unloaded the take-up reel, see <u>Unload a roll from the printer on page 35</u>.

The edge holders

The edge holders are designed to prevent the edges of the substrate from rising while printing is in progress. They are recommended for textile and double-sided printing (even if the front panel does not suggest them), and are not normally necessary in other situations. When not in use, they can be stored in their case at the rear of the printer.

If you choose to use them, you should place them on the platen when prompted by the front panel (this prompt appears when using the loading accessory). Open the window, place the edge holders, then close the window.

⚠ **WARNING!**   Do not touch the printer's drying enclosure. Even after you have opened the window latch, which disconnects the power to the drying and curing modules, the internal surfaces could be hot.

The edge holders should be placed on the platen so that they slightly overlap the left and right edges of the substrate. The edge holders fit into holes in the platen, and they are magnetic, which helps them to stay in place.
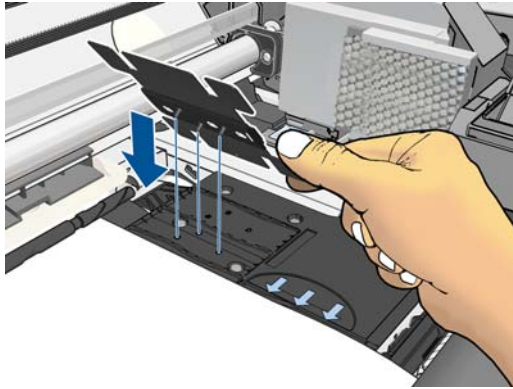
Slide the edge holder to the left or right with your fingers so that you can see the edge of the substrate in the two square holes in the side of the edge holder.
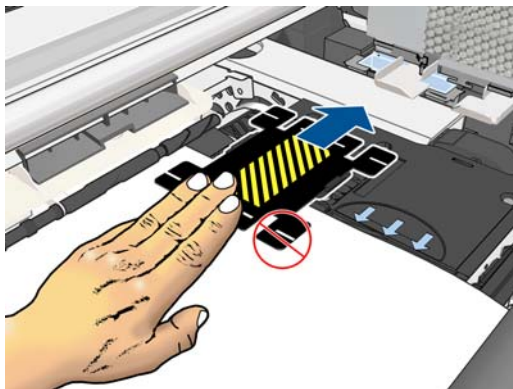
The following picture shows an edge holder correctly placed.
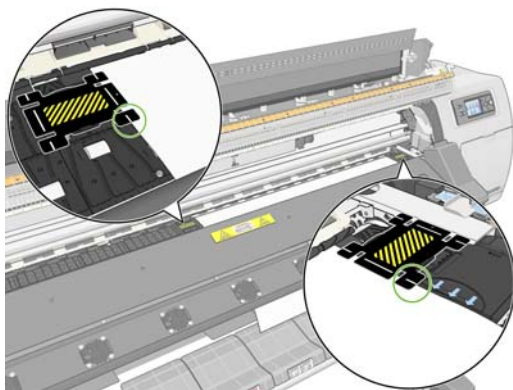
NOTE: When you use the edge holders, your prints should have a minimum margin of 10 mm.

NOTE: Remove the edge holders when the end-of-roll message appears.

The loading accessory

The loading accessory is designed to help in loading banner/textile/mesh substrates. It is recommended when loading such substrates, but not obligatory.

The printer comes with two loading accessories: one for rolls up to 1.55 m (61 in) wide and one for rolls up to 2.64 m (104 in) wide. The smaller loading accessory can also be used for wide rolls if you prefer.

NOTE: The edge holders can be used whether or not you decide not to use the loading accessory.

1. Select **Load with accessory** from the Substrate Load menu on the front panel.
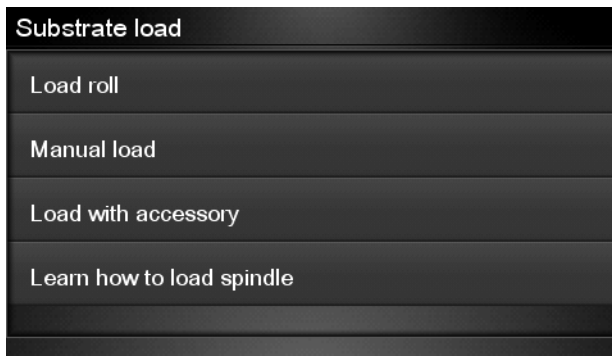
NOTE: If you select **Load with accessory**, a message is displayed asking whether you want to use the edge holders.

2. Lay the textile loading accessory on the floor and flip forward enough of the white flaps to cover the width of the substrate.
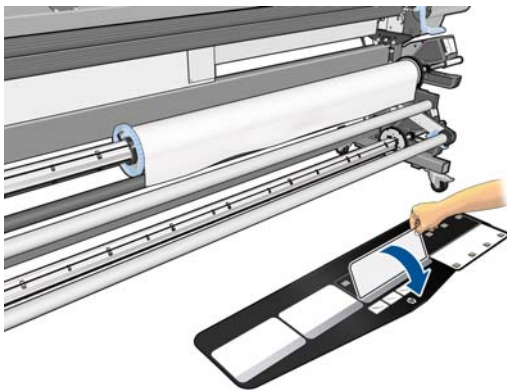
3. Pull some of the substrate from the roll and put the leading edge on the loading accessory.
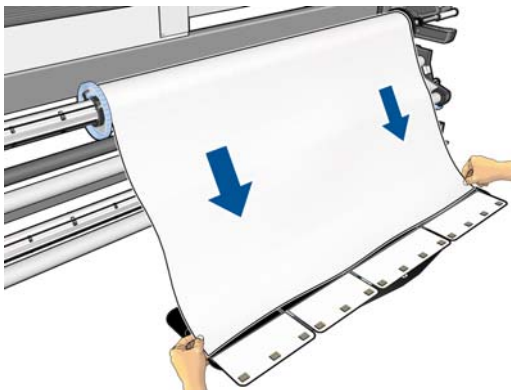
4. Flip the white flaps back to cover the leading edge of the substrate. The black patches are magnetic and grip the substrate.
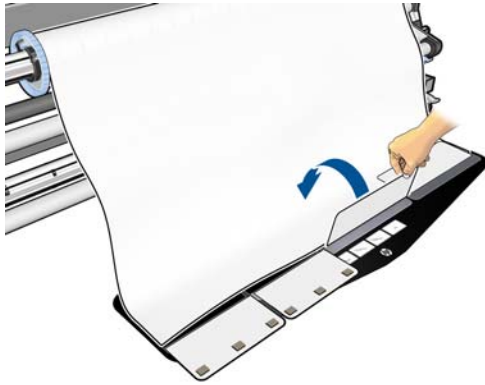
5. Lift the loading accessory and the leading edge of the substrate together.
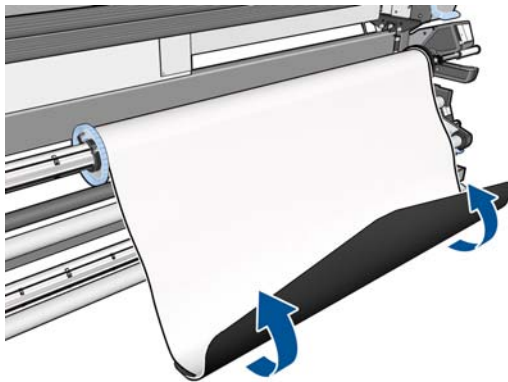
6. Load the substrate manually, see .
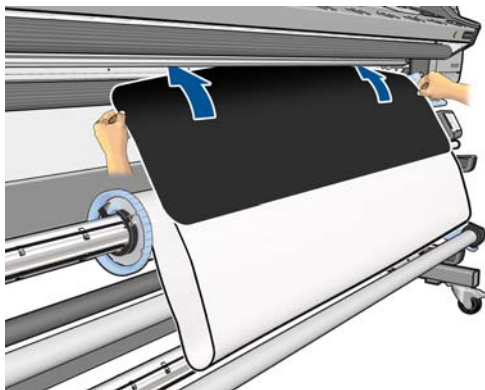
7. The loading accessory passes through the printer's substrate path with the substrate.
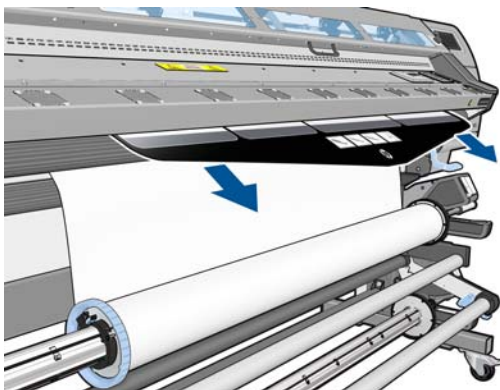
8. The front panel asks whether you want to use the edge holders. See The edge holders on page 44.

9. Select the type of substrate you are loading.

NOTE: You should select the name of the particular substrate that you are using in your RIP software, not in the front panel.

TIP: When loading very thin substrates, always select the substrate type as **Banner** to minimize the vacuum pressure applied while loading; when loading very thick substrates, always select the substrate type as **HP Photorealistic** to maximize the vacuum pressure. After loading and before printing, go to the front panel and change to the correct type for the substrate you are loading: press [icon], then [icon], then **Substrate** > **Change loaded substrate**.

10. After passing through the printer, the loading accessory can be removed by hand.
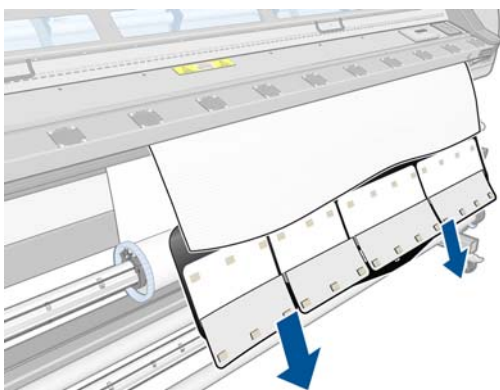
11. The printer checks the substrate in various ways and may ask you to correct problems with skew or tension.

NOTE: You can specify the maximum permitted amount of skew at the front panel: press [icon], then [icon], then **Substrate** > **Substrate handling options** > **Max skew setting**.

12. If you are loading transparent substrate without opaque borders, you are asked to enter the width of the substrate and the distance of the right edge from the printer's side plate (as indicated by the ruler on the front of the curing module).

13. If you have chosen double-sided printing, the front panel may ask a question about it at this point.

14. The printer calibrates the substrate advance.

15. The front panel recommends using the take-up reel. You can choose to load the take-up reel now, or later during printing; or you can choose not to use it at all. See The take-up reel on page 35.
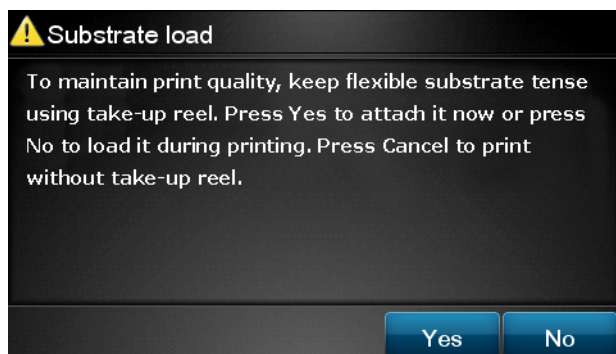
16. Complete the loading process as usual and adjust the skew if necessary.

Double-sided printing

The printer can be used to print on both sides of the substrate, in the following way.

NOTE: The print should be at least 28 cm (11 in) wide, otherwise the printer will not be able to find the reference line when printing the second side.

Outline

1. Tell the printer that you intend to print on both sides.

2. The printer prints the content that you want to appear on the first side. After each job, the printer prints a black reference line that is used to align the matching job on the second side.

3. Cut and unload the substrate.

4. Reload the cut substrate upside down and starting at the end. The reference line marking the end of the first side should be face down and near the leading edge.

5. The printer finds the reference line, and uses it to start printing the second side in the right place.

Double-sided printing can be selected in your RIP software or at the printer's front panel. The RIP setting takes precedence: if double-sided printing is explicitly turned on or off in the RIP software, the front panel setting is ignored.

NOTE: If you try to move the substrate while printing on either side, the front panel asks for confirmation, because any such movement prevents correct alignment between the two sides.

Double-sided printing in detail

1.   Load the substrate in the normal way for the substrate you are using.

2.   On the printer's front panel, press [icon] , then [icon] , then **Substrate** > **Double-sided printing** > **Side A**. Return to the home screen and check that the printer status is shown as **Ready to print side A**.

     Alternatively, select double-sided printing in your RIP software.

     NOTE: The automatic cutter and the extra bottom margin are both disabled during double-sided printing.

3.   Send one or more jobs to be printed on the first side. Before printing the first job, the printer may advance the substrate by about 0.5 m (20 in) so that the second side can be completely cured. After each job, the printer prints a black reference line that is used to align the matching job on the second side.

     NOTE: The chance of visible misalignment between the two sides increases with the length of the job. For this reason, in double-sided printing you are recommended not to print any single job that is longer than 3 m (10 ft).

4.   After printing, advance the substrate a little by going to the front panel and pressing [icon] , then [icon] , then **Substrate** > **Move substrate**.

     ●   If you plan to attach the substrate to the take-up reel before printing the second side, advance the substrate enough to achieve this.

     ●   If you plan to attach the substrate to the take-up reel while printing the second side, advance the substrate about 10 cm (4 in).

5.   Cut the substrate, either manually or by going to the front panel and pressing [icon] , then [icon] , then **Substrate** > **Form feed and cut**. Before cutting, ensure that the total length of the cut substrate is more than 2 m (6 ft 7 in), otherwise you may be unable to load it successfully.

     NOTE: The **Form feed and cut** command will not work if the substrate cannot be cut by the cutter.

6.   Press [icon] , then [icon] , then **Substrate** > **Substrate unload**.

7.   Reload the substrate with the first (printed) side facing up as it enters the printer, and with the reference line near the leading edge. Reload if necessary until the printer finds less than 1 mm/m skew.

     TIP: Although it is not strictly necessary, you may find it quicker to use the manual loading procedure as an initial approximation, and then allow the printer to find the reference line more accurately. See Load a roll into the printer (manually) on page 31. If you use only the automatic loading procedure, the printer may take some time to find the reference line.

     TIP: You are recommended to use the edge holders when printing the second side, which means using the manual loading procedure.

     TIP: If you have deliberately not attached the substrate to a spindle, and the front panel reports that the substrate may be detached from the core, or that the feeding direction is not detected, you can ignore the message and continue.

8.   The front panel asks, **Would you like to load substrate for printing as side B?** Select **Yes**.

9.   The printer searches for the reference line on the substrate. If it fails to find it, the front panel asks you to move the substrate using the Up and Down keys until the reference line is aligned with the permanent line on the platen. You may find it useful to mark where the reference line is on the other side of the substrate.
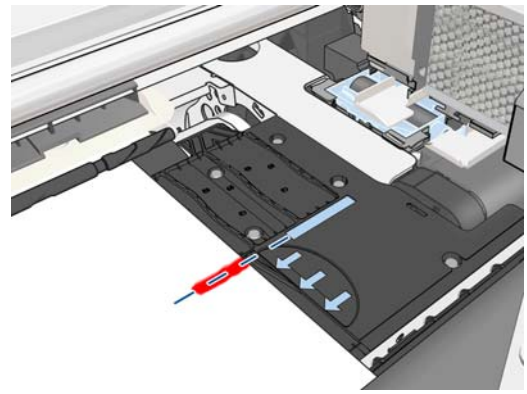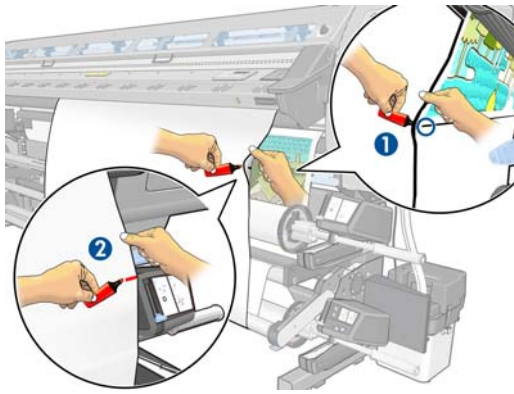
> **NOTE:** If you know that the automatic search for the reference line is not working (perhaps because the substrate-advance sensor is dirty), you can turn it off: press ![icon], then ![icon], then **Substrate** > **Substrate handling options** > **Enable auto line detection** > **Off**.

10. Send one or more jobs to be printed on the second side. If you send more than one job, they should be sent in reverse order, because printing starts at the end of the second side and works back towards the beginning.

> **NOTE:** The jobs printed on the second side should probably be rotated 180 degrees, and may need to be slightly reduced in size to compensate for the contraction of the substrate after passing once through the printer. See The substrate has shrunk or expanded on page 137.

View information about the substrate

On the front panel's home screen, press ![icon].

The following information appears on the front panel:

*   The roll status
*   The substrate family that you have selected
*   The width of the substrate in millimeters (estimated by the printer)

If no substrate is loaded, the message **Out of substrate** appears.

The same information appears on the Embedded Web Server's Supplies page.

Substrate length tracking

The substrate length tracking feature enables you to keep track of how much substrate you have used and how much is remaining on the roll.

1. When the roll is first loaded onto the printer you have the option to enter the length of substrate on the roll. The amount of substrate that is subsequently used is then tracked.

2. When the substrate is unloaded, the front panel displays the amount remaining so that you can note it for future reference.
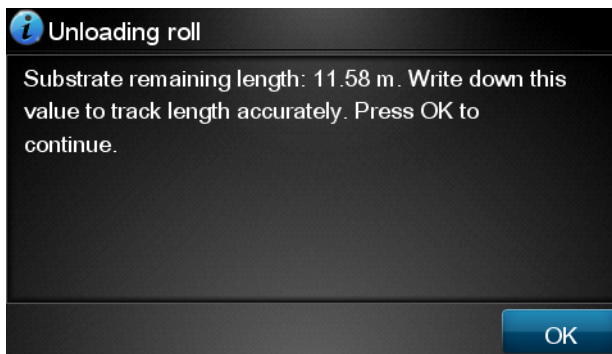
3. Next time the substrate is loaded, you can enter the remaining length, and the printer again tracks the substrate as it is used. If the substrate was never actually unloaded, for example if there was a substrate jam and the substrate was unloaded and the printer was turned off and on, if you select **Last known length** the printer will apply the values from when the jam occurred (if the tracking feature was enabled).

The remaining length of substrate is always displayed in the Substrate area of the front panel. This information may also be displayed in your RIP.

Enable/disable the length tracking feature

1. The length tracking feature can be disabled or enabled from the front panel. Press , then , then **Substrate** > **Substrate handling options** > **Substrate length tracking**.

2. Select **On** or **Off**.

Form feed and cut

The **Form feed and cut** option is available from the printer's front panel. If you press ![info icon], then ![wrench icon], then **Substrate** > **Form feed and cut**, the printer normally advances and cuts the substrate. Here is a list of its other functions:

- If the printer is waiting for more pages to be nested, **Form feed and cut** cancels the waiting time and prints the available pages immediately.

- If the printer is drying the ink after printing, **Form feed and cut** cancels the waiting time and releases the page immediately.

- If the take-up reel is enabled, **Form feed and cut** advances the substrate 10 cm (3.9 in), but does not cut it.

NOTE: The cutter is disabled when the take-up reel is in use, and when a banner or textile substrate is loaded.

Store the substrate

The following are tips for storing substrate:

- Always keep unused rolls wrapped in the plastic wrap to prevent discoloration and dust accumulation. Rewrap partially used rolls if they are not being used.

- Do not stack rolls.

- Allow all substrates to adapt to room conditions out of the packaging for 24 hours before printing.

- Handle film and glossy substrates by the edges or wear cotton gloves. Skin oils can be transferred to the substrate, leaving fingerprint marks.

- Keep the substrate tightly wound on the roll throughout the loading and unloading procedures. If the roll starts to unwind, it can become difficult to handle.

5   Substrate settings

Download media presets

Each supported substrate has its own characteristics. The printer changes the way it prints on each different substrate. The RIP requires a description of the requirements of each substrate. This description is called the "media preset".

The media preset contains the ICC color profile, which describes the color characteristics of the substrate. It also contains information about other characteristics (RIP and printer settings, such as drying and curing temperatures, vacuum pressure and substrate advance compensation) and requirements of the substrate that are not directly related to color. Media presets for your printer are installed in the RIP.

The RIP contains media presets for only the most commonly used substrates. If you buy a substrate for which your RIP has no preset, you can obtain a preset for a new substrate in the following ways:

- Try to download the media preset from the substrate manufacturer's Web site.

- If it is not there, try to download it from the RIP company's Web site.

- If it is not there, check availability using the HP Media Finder search application located at http://www.hp.com/go/latexmediafinder/

- If you cannot find it anywhere, create a new media preset in the RIP, or copy a similar existing media preset and modify it. See Add a new substrate on page 55.

- Further information can be found at http://www.hp.com/go/L28500/solutions/.

Add a new substrate

This section is provided in case you decide to make your own media preset. Normally there is no need to do this if you can find ready-made presets for all the substrates that you use.

Summary

Load substrate and align printheads
1. If the substrate roll is narrower than the spindle, move the right-hand stop to its leftmost position.
2. Select a generic substrate family at the printer's front panel.

Create and/or install a new media preset following the RIP instructions
1. Check media preset availability in the RIP and/or substrate vendor's website.
2. If not available, check again using the HP Media Finder search application located at www.hp.com/go/latexmediafinder.

Was media preset available?

No

Yes

1. Choose the generic substrate family.
2. In the RIP, create a copy or use an available media preset from the chosen family.
3. If you create a copy, select a name for the new substrate.

Start printing using the available print modes

Start printing
1. Select the initial print mode. For the first trial, a 12-pass bidirectional print mode is recommended. Reset your print mode to default category values for that print mode.
2. Print the diagnostic plot available in ip-addr/hp/device/webAccess/images/new.tif, where ip-addr is the IP address of your printer.

Is the print quality OK?

Check (and correct if needed) the ink quantity in the printed plot.

No

Yes

Is the print quality OK?

No

Consult the information resources available at www.hp.com/go/L28500/solutions.

Yes

Process complete

Select printer settings and color profile

The correct printer settings for your substrate may be available from your RIP vendor or substrate vendor. If not, you can start by copying printer settings from a similar substrate of the same family. See Supported substrate families on page 22.

If you cannot find a similar substrate for some reason, here are some recommended default settings for each substrate family.

Substrate family	Drying temp.	Curing temp.	Heating airflow	Auto-tracking (OMAS)	Cutter	Sub-strate-advance compensation	Input tension	Vacuum
Self-Adhesive	55	105	30	Yes	Yes	0	15	25
Banner	50	100	45	Yes	No	0	15	5
Textile	55	100	45	Yes	No	0	15	20
Film	55	95	30	Yes	Yes	0	15	25
Synthetic Paper	50	80	30	Yes	Yes	0	15	40
Paper-Aqueous	45	70	30	Yes	Yes	0	15	20
Paper-Solvent	50	90	30	Yes	Yes	0	15	25
Low temp (incl. HP Photoreal)	50	80	30	Yes	Yes	0	15	40
Mesh	50	95	30	Yes	Yes	0	15	30

The various settings mentioned above are described below.

Setting	Description	If too low	If too high
Passes	The number of passes specifies how many times the printheads will print over the same area of the substrate.	The amount of ink fired per time unit is larger and ink has less time to dry on the substrate. This may create coalescence and banding. The boundaries between passes may be more visible. However, printing speed is relatively high.	Colors are vivid, print quality is high. However, printing speed is relatively low. A lower curing temperature is needed, otherwise the substrate may be deformed.
Drying temp.	The heat applied in the printing zone removes water and fixes the image to the substrate.	Print-quality defects such as banding, bleeding and coalescence may occur.	Thermal marks may be seen on the substrate; they may appear as vertical bands in some colors. The substrate may wrinkle on the platen, causing vertical banding, ink smears or substrate jams.
Curing temp.	Curing is needed to coalesce the latex, creating a polymeric film which acts as a protective layer, while at the same time removing the remaining co-solvents from the print. Curing is vital to ensure the durability of the printed images.	The print may emerge not fully polymerized, so that the ink smears when rubbed. The print may appear wet, after printing or later. You may need to increase the number of passes to achieve adequate curing.	The substrate may wrinkle under the curing module, causing defects such as blisters or liner detachment. The substrate wrinkles may also cause vertical banding or ink smears at the beginning of the following plot.
Heating airflow	Airflow helps to remove the evaporated water from the print zone and thus allows more efficient drying.	In general, use the substrate family default value.	
Substrate advance compensation	Your printer was calibrated at the factory to ensure that it advances the substrate accurately when using supported substrates in normal environmental conditions. However, you may find it useful to adjust the substrate advance when printing in an unusual but stable temperature or humidity level, or if the substrate-advance sensor is not working.	You may see horizontal banding or grain.	You may see horizontal banding or grain.

Setting	Description	If too low	If too high
Input tension	Tension is applied to the substrate from the input spindle. It needs to be constant over the full width of the substrate, thus substrate load is a critical operation.	The substrate skews and may become increasingly wrinkled in the printing zone. Also, substrate advance may be irregular, resulting in horizontal banding.	The substrate may be permanently deformed or damaged. Substrate advance problems may appear in extreme cases.
Vacuum	The vacuum applied to the substrate at the printing zone helps to hold the substrate down on the print platen, keeping the distance to the printheads constant.	The substrate may lift up off the platen and touch the printheads. This can smear the printed image, cause vertical banding, cause a substrate jam or even damage the printheads.	For sticky substrates, friction could be too high and substrate advance irregular, resulting in horizontal banding or irregular grainy patches.
Bidirectional	Specifies whether printheads print in both directions, when moving from left to right and from right to left.	If Bidirectional is selected, the amount of ink fired per unit of time is larger, and therefore print quality defects such as coalescence and banding may occur, especially at the sides of the plot. However, printing speed is high.	If Bidirectional is unchecked then the printing is unidirectional and the speed is relatively low. **TIP:** You are recommended to keep Bidirectional selected in all cases, increasing the number of passes if necessary to avoid coalescence and banding.
High ink level	The maximum quantity of ink will be laid on the substrate (the High ink level option available only when the number of passes is 10 or more). The ink quantity may be reduced by the RIP color profile.	If not selected, colors may look washed-out.	If selected, there can be excess of ink and some problems related to poor drying and curing. **TIP:** Select High ink level for backlit and some textile applications, or if you want high color saturation.
Cutter	The printer's built-in cutter can cut the substrate automatically between each print.	Disable the cutter in the following cases: ● You want to increase the speed of printing. ● You want to use the take-up reel. ● You want to cut the substrate manually. ● The leading edge of the substrate tends to curl and cause substrate jams. In some cases, the cutter is automatically disabled.	
Auto tracking (OMAS)	The substrate-advance sensor (also known as the Optical Media Advance Sensor, OMAS) is located under the print platen; it can track the substrate advance automatically.	Disable the sensor in the following cases: ● The substrate allows ink to pass through to the platen. Clean the sensor after using this substrate. ● You are instructed to do so by the front panel, because the sensor is dirty or unable to track this particular substrate.	

Load the substrate and print the diagnostic plot

1. Load the substrate in the normal way, paying particular attention to the following points.

- The stop at the right-hand end of the spindle has two possible positions on the spindle. Always use the leftmost position if possible. Use the rightmost position only if the substrate roll requires the full width of the spindle.

- Turn off the substrate-advance sensor (OMAS) in the RIP if the substrate is transparent or its underside is dark, or if the printer recommends you to do so.

- Align the printheads.

2. Open the HP diagnostic chart in the RIP. The chart is stored in your printer, at **http://**_ip-addr_**/hp/device/webAccess/images/new.tif**, where _ip-addr_ is the IP address of your printer.

3. Select a suitable number of passes for the substrate family. See Select the number of passes on page 61.

4. Reset your print mode to default category values for that print mode.

5. Print the plot.

Change settings while printing

You can use the front panel to change the following settings while printing.

- To change temperature, vacuum and inter-pass dry time settings while printing: press ▤, then **Adjustments**, and choose the setting that you want to adjust. You can use the arrow keys to adjust the curing temperature, the drying temperature, the vacuum pressure or the inter-pass dry time (delay between passes). The changes that you make take effect immediately, but they are not saved: the next job will use the settings in the media preset as usual. If you want to change the settings permanently, you must change them in the media preset in the RIP.

- To change substrate advance calibration while printing (in case of banding): press ▤, then **Adjustments** > **Adjust substrate advance**. You can use the arrow keys to adjust the substrate advance. The changes that you make take effect immediately, but they are not saved for the next job. See also Substrate advance adjustment on the fly on page 126.

- To enable or disable extra printhead cleaning while printing: press 🛈, then 🔧, then **Ink** > **Image-quality maintenance** > **Extra PH cleaning**. In this case, the change of setting _is_ saved for subsequent jobs.

    NOTE: Extra printhead cleaning shortens the life of the printhead cleaning cartridge.

Advanced settings

Here are some more advanced settings, which you are not recommended to change, unless you have problems that you cannot resolve any other way.

The drying and curing temperatures used by the printer are determined by adding the offset to the base temperature. The base temperatures shown in the table are the default values for each substrate family, but may be changed by the printer depending on the printer settings in use. You cannot change the base temperatures yourself, but you can change the offsets. The base warm-up drying temperature is determined by the RIP.

Your RIP may have an option to return all settings to their default values.

Substrate family	Warm-up drying temperature offset	Warm-up curing temperature	Warm-up curing temperature offset	Cool-down drying temperature	Cool-down drying temperature offset	Cool-down curing temperature	Cool-down curing temperature offset	Minimum drying power	Inter-pass drying time
Self-Adhesive	5	95	0	80	0	95	0	0.7	0

Substrate family	Warm-up drying temperature offset	Warm-up curing temperature	Warm-up curing temperature offset	Cool-down drying temperature	Cool-down drying temperature offset	Cool-down curing temperature	Cool-down curing temperature offset	Minimum drying power	Inter-pass drying time
Banner	5	95	0	80	0	90	0	0.7	0
Textile	5	85	0	80	0	90	0	0.7	0
Film	5	85	0	80	0	100	0	0.7	0
Synthetic Paper	5	80	0	75	0	85	0	0	0
Paper-Aqueous	5	60	0	75	0	85	0	0	0
Paper-Solvent	5	75	0	75	0	90	0	0.7	0
Low temp (incl. HP Photoreal)	5	80	0	75	0	85	0	0	0
Mesh	5	85	0	80	0	95	0	0.7	0

The various settings mentioned above are described below.

Setting	Description	If too low	If too high
Warm-up drying temperature	The base temperature that the substrate in the print zone must reach before printing starts.	This setting is determined by the RIP. You cannot change it.	
Warm-up drying temperature offset	This offset is added to the base warm-up drying temperature, and the total is displayed in the front panel while the printer is preparing to print.	Bleeding or coalescence may appear in the first 200-300 mm of the print.	A longer time to start printing is required. Vertical banding or ink smears may occur.
Warm-up curing temperature	The base temperature that the substrate in the curing zone must reach before printing starts.	This setting is determined by the printer. You cannot change it.	
Warm-up curing temperature offset	This offset is added to the base warm-up curing temperature, and the total is displayed in the front panel while the printer is preparing to print.	The beginning of the print is not fully dry, or looks oily.	Substrate degradation (blisters, adhesive detachment) at the beginning of the print.
Cool-down drying temperature	The base temperature at which the substrate can be under the drying module without being damaged. At the end of a job, the substrate is not stopped until this temperature is reached.	This setting is determined by the printer. You cannot change it.	
Cool-down drying temperature offset	This offset is added to the base cool-down drying temperature.	A long time is needed to finish the print.	The substrate at the beginning of the next print may be damaged, because it has stopped moving under too high a temperature. This case is uncommon.
Cool-down curing temperature	The base temperature at which the substrate can be under the curing module without being damaged. At the end of a job, the substrate is not stopped until this temperature is reached.	This setting is determined by the printer. You cannot change it.	

Setting	Description	If too low	If too high
Cool-down curing temperature offset	This offset is added to the base cool-down curing temperature.	A long time is needed to finish the print.	The end of the print may be damaged if the cutter is disabled.
Minimum drying power	The minimum power applied in the drying module while printing, so the substrate does not cool too much in lightly inked areas.	A heavily inked area that comes after a lightly inked area will have bleeding or coalescence defects.	The substrate is damaged in blank or lightly inked areas of the print, especially with a high number of passes.
Inter-pass drying time	A delay between consecutive passes of the printhead carriage across the substrate.	Drying and/or curing may not be sufficient in some cases.	Printing is slower.

Temperature profile

Many of the main and advanced substrate settings are related to temperature control, since this is a critical area for correct printing results with latex inks on a wide variety of substrates. The diagram below graphically represents the evolution of drying and curing temperatures during the various printing phases.

t_a	ambient (~25 °C/77 °F)	t_c	curing
t_p	prepare (45 °C/113 °F)	t_{ic}	internal curing
t_d	drying	t_{wco}	warmup curing offset
t_{wdo}	warmup drying offset	t_{cc}	cooldown curing
t_{cd}	cooldown drying	t_{cco}	cooldown curing offset
t_{cdo}	cooldown drying offset		
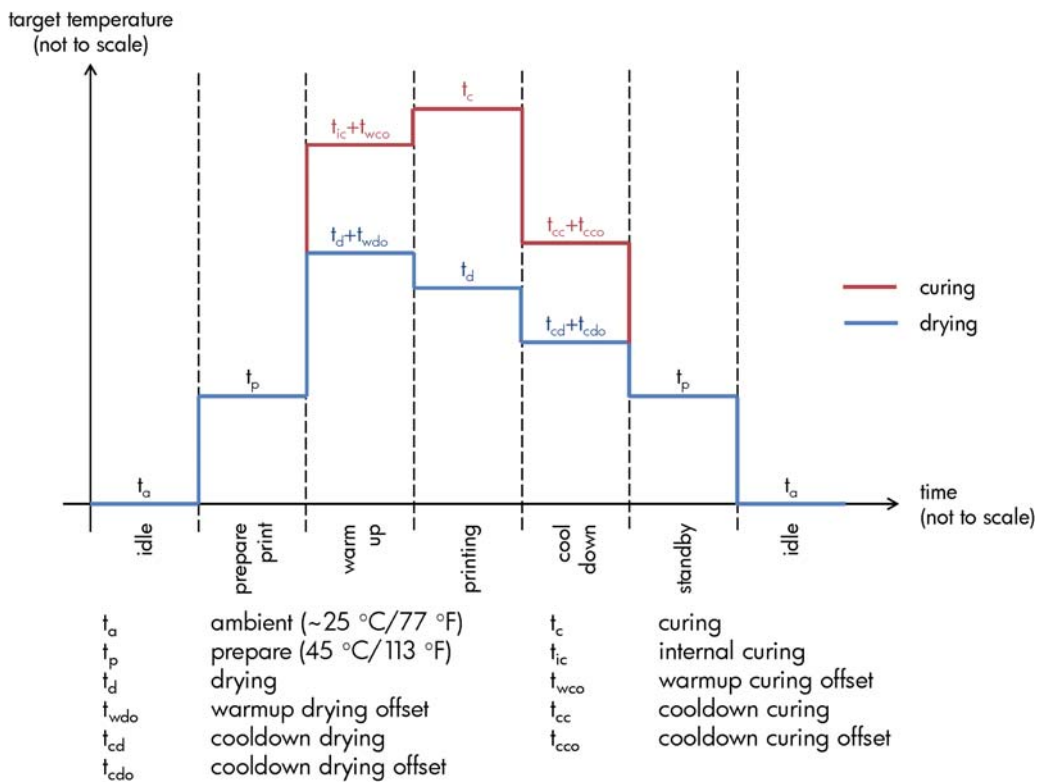
NOTE: Target temperatures and time are not to scale. For the specific values used for a given substrate type (family), consult the main and advanced settings tables above.

NOTE: t_p time can be modified through the printer's front panel.

Select the number of passes

Increasing the number of passes will tend to improve the print quality but reduce the speed of printing.

NOTE: The following table is for bidirectional printing only, and with normal ink limit, unless otherwise indicated.

Passes	Carr. speed	Self-Adhes.	Banner	Textile[1]	Film[2]	Synth. Paper	Paper-Aqueous	Paper-Solvent	Low temp	Mesh
2	Speed	X	X	X	X	X	Low ink	Low ink	Low ink	X
2	Std	X	X	X	X	X	Low ink	Low ink	Low ink	X
4	Speed	No	Maybe	No	No	No	Maybe	Maybe	Maybe	No
4	Std	No	Maybe	No	No	No	Maybe	Maybe	Maybe	No
6	Speed	Maybe	Wide	No	No	No	Wide	Wide	Wide	Maybe
6	Std	Maybe	Yes	No	No	No	Yes	Yes	Yes	Maybe
8	Speed	Wide	Yes	Maybe	Maybe	No	Yes	Yes	Yes	Yes
8	Std	Yes	Yes	Maybe	Maybe	Maybe	Yes	Yes	Yes	Yes
10	Speed	Yes	Yes	Yes[3]	Maybe	Maybe	Yes	Yes	Yes	Yes
10	Std	Yes	Yes	Maybe	Maybe	Maybe	Yes	Yes	Yes	Yes
12	Speed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	Std	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	Speed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	Std	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18 uni	Std	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20—28	Std	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

[1] Normal or high ink limit may be used
[2] High ink limit should be used
[3] Recommended with normal ink limit; may be worth trying with high ink limit

Key

- **X:** Do not use
- **No:** Expect low print quality
- **Low ink:** May be worth trying for extra speed, but with a very low ink limit
- **Maybe:** May be worth trying for extra speed
- **Wide:** Recommended only for printed images wider than 60 in (236 mm).
- **Yes:** Recommended
- **Uni:** Unidirectional printing only

NOTE: More specific settings for many substrates from different vendors are available in the HP Media Finder at http://www.hp.com/go/latexmediafinder/.

NOTE: After selecting the number of passes, make sure to reset your print mode to default category values for that print mode.

Tips

- 4 to 16 passes should cover most printing needs.
- 2 to 6 passes provide lower print quality. Also, the color gamut will be slightly reduced, as total ink is limited to allow for drying and curing.

- For time-critical applications, 2 to 16 passes using a higher carriage speed (1.5 m/s (60 in/s) versus the standard speed of 1 m/s (40 in/s)) can be selected from the RIP.

  ◦ The increased carriage speed provides about a 15 to 30% gain in throughput (m^2/h).

  ◦ Minor color shifts may be noticed if you reuse presets obtained with the standard carriage speed. You may wish to create a new preset for the higher carriage speed.

- For high-ink applications, you are recommended to use at least 8 passes, depending on the substrate family. Print modes of 20 and more passes have been included to ensure proper drying and curing in certain cases.

- 1200 dpi print resolution is available in the 18-pass print mode only. Make sure you have a specific media preset for this print mode, because reusing others may not deliver the expected print quality.

- For fast layout proofing on cheap substrates, a low-ink 2-pass print mode has been enabled on paper-based substrates. This mode is not intended for use with higher-quality substrate families, as drying and curing will not work properly. This is not designed to be a production print mode, but for occasional usage, as prolonged 2-pass printing may harm your printheads.

Check the quantity of ink on the substrate

Check that the ink quantities in your media preset are adequate. Look at the color patches in the HP diagnostic chart and check that the patches have the correct amount of ink using the guidelines below:

1. **Too much ink:** There are several possible symptoms of this problem.

   - The last two or three scales of the chart look the same.

   - Vertical bands.
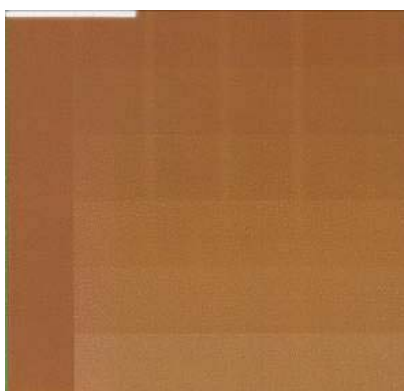
● Horizontal bands.
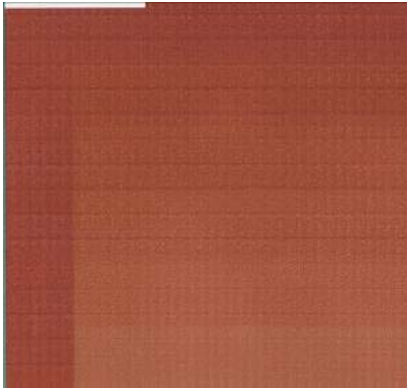
● Coalescence, grain (can be caused by an excess of light ink).
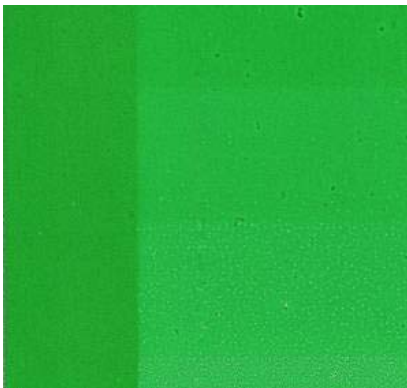
Try reducing the amount of ink in your RIP software, then reprint the chart and check again.

You may have chosen a media preset that uses more ink than your substrate allows. Consult your RIP documentation to make sure you're applying the right media preset, and to find out how to lower the total ink limits of the media preset. For a quick solution, you could change to a different media preset that uses less ink: for example, paper-aqueous presets use less ink than self-adhesive presets.

2. **Correct amount of ink:** The top level of each patch shows a smooth gradient, there are no visible defects and increasing amounts of ink result in increasing color density.
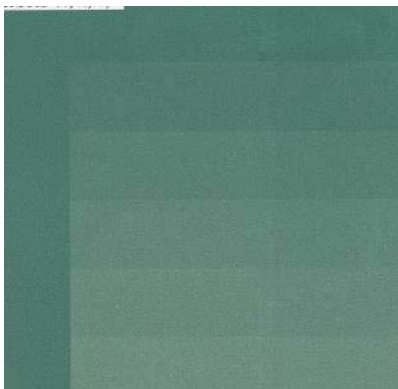
3. **Too little ink:** The whole chart looks washed out.
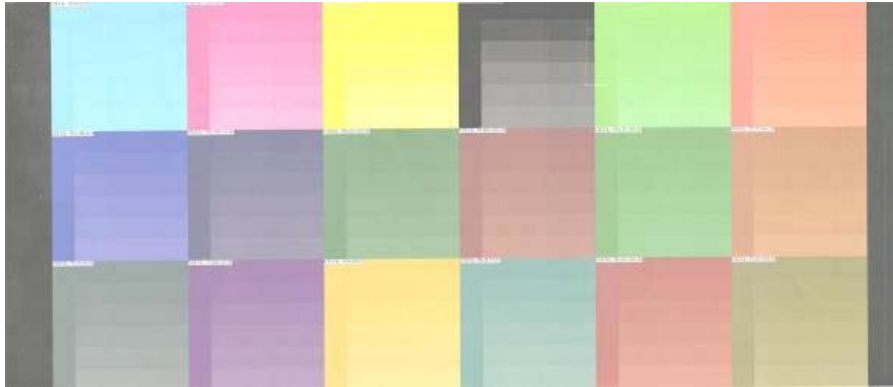
Try increasing the amount of ink in your RIP software, then reprint the chart and check again.

You may have chosen a media preset that uses less ink than your substrate allows. Consult your RIP documentation to make sure you're applying the right media preset, and to find out how to increase the total ink limits of the media preset. For a quick solution, you could change to a different media preset that uses more ink: for example, self-adhesive presets use more ink than paper-aqueous presets.

NOTE: Backlit and some textile substrates usually need to be used with the "High Ink Limit" option enabled in the RIP.

Faster printing

The obvious way to increase speed is to reduce the number of print passes and/or increase the carriage speed to 1.5 m/s (60 in/s), although these will tend to reduce print quality. Bear in mind the following considerations.

*   With fewer than 10 passes, you may see an increase in grain.

*   With fewer than 8 passes, the printer is more sensitive to substrate advance problems.

*   With fewer than 8 passes, you may need to reduce the ink quantity to improve print quality.

*   With carriage speed at 1.5 m/s (60 in/s), you may need longer inter-pass drying times or a lower ink quantity for proper drying.

*   If you want to use the high ink level option, you must use at least 10 passes.

*   As you reduce the number of passes, the best curing temperature may be more difficult to find, and may be more sensitive to the ambient temperature and humidity.

Here are some other suggestions for increasing the speed of printing.

*   Concatenating prints saves time, because one can be sent while another is being printed.

*   Disable the cutter: press ![info icon], then ![wrench icon], then **Substrate** > **Substrate handling options** > **Cutter** > **Off**. With most substrates, this saves some time at the end of the printing process.

*   Increase the cool-down curing temperatures. This also saves some time at the end of the printing process, but may cause slight substrate deformation, depending on the substrate.

> **NOTE:** Printing continuously for more than 2 hours can reduce the life of the printheads. An occasional brief pause allows the printer to service the printheads.

See also .

Color calibration

The purpose of color calibration is to produce consistent colors with the specific printheads, inks and substrate that you are using, and in your particular environmental conditions. After color calibration, you can expect to get identical prints from your printer on different occasions.

Color calibration can be launched from your RIP software; see your RIP documentation for details.

In outline, the process consists of the following steps.

1. A calibration test chart is printed.

2. The HP Embedded Spectrophotometer (or, if you prefer, a different spectrophotometer) scans and measures the test chart.

3. The RIP uses the measurements to calculate the necessary correction factors for consistent color printing on that substrate.

Color calibration with the Embedded Spectrophotometer is not recommended for the following substrate types. It may be possible to calibrate some of these substrates by using an external color measurement device.

*   Non-opaque substrates such as clear film, backlit substrates, and some textiles.

*   Substrates with an uneven surface, such as perforated vinyl or punched-window substrates.

- Substrates that suffer deformation from drying and curing, such as paper-based substrates.

- Very elastic substrates, such as some textiles without liner.

Substrates suitable for color calibration include even-surfaced adhesive vinyls (neither punched nor perforated), PVC banners and some opaque, stiff textiles.

Some textiles require the take-up reel for successful printing. However, the take-up reel may fail to cope with the backward movement of the substrate between the printing and scanning phases of color calibration. To avoid this problem, proceed as follows.

1. Ensure that the take-up reel is enabled.

2. Advance the substrate until the tension bar reaches its lowest position.

3. Manually rewind the take-up reel, using the buttons on the take-up reel motor, to collect the substrate and raise the tension bar until it almost touches the take-up reel.

4. Set the take-up reel's winding direction to neutral.

5. Launch color calibration from the RIP.

6. When the color calibration has finished, you can re-enable the take-up reel.

Color profiles

Color calibration provides consistent colors, but consistent colors are not necessarily accurate. For instance, if your printer prints all colors as black, its colors may be consistent but they are not accurate.

In order to print accurate colors, it is necessary to convert the color values in your files to the color values that will produce the correct colors from your printer, your inks and your substrate. A color profile is a description of a printer, ink and substrate combination that contains all the information needed for these color conversions.

NOTE: Although color profiles obtained in one particular print mode can be reused when printing with other print modes, the most accurate color reproduction can only be achieved if profiling is made with exactly the same print mode that is used for printing. For example, if you use a color profile obtained with a 10-pass STANDARD print mode, you may see some color difference when you use it to print with an 8-pass SPEED print mode

These color conversions are performed by your Raster Image Processor (RIP), not by the printer. For further information on the use of color profiles, see the documentation for your application software and for your RIP.

In addition to the color profiles used for printing, you may wish to calibrate and profile your monitor (display device), so that the colors you see on the screen relate more closely to those that you see on your prints.

Color reproduction tricks

Latex inks are a new technology, and there are some important guidelines when doing color separations (such as when creating or modifying a new media preset within your RIP) that will help to optimize the printer output in terms of color gamut, ink usage and print quality. These are as follows:

- To achieve the best dark colors in vinyl gloss and other substrates, use as much black and as little composite (CMY) as possible when creating the ICC profile.

- Light inks should be avoided as much as possible in high-density colors such as secondaries and tertiaries (dark red, blue, green, …).

- Light inks should be restricted to the lowest-density colors, starting the use of dark inks as early as possible. Typically, a color of more than 50% density should not contain any light inks.

- Light inks should be used at no more than 50% of maximum quantity. An excessive amount of light inks can create gloss artifacts in vinyl gloss substrates.

- For tiling applications, using the RIP to add a small inter-pass delay of 0.5 to 1 second will yield better color matching from left to right.

Please refer to your RIP documentation for details of how to create or modify media presets.

Presets for HP-branded substrates have been created following the above recommendations in order to optimize black and dark colors. You can find the HP media preset for your substrate family at http://www.hp.com/go/latexmediafinder/.

6 Retrieving usage information

- Get accounting information
- Check usage statistics
- Check usage statistics for a job
- Request accounting data by E-mail

Get accounting information

There are various different ways of getting accounting information from your product.

- View product usage statistics for the whole lifetime of the product, see Check usage statistics on page 70.

- Request accounting data by E-mail. The product sends data in XML at regular intervals to a specified E-mail address; the data may be interpreted and summarized by a third-party application, or displayed as an Excel spreadsheet. See Request accounting data by E-mail on page 70.

- Use a third-party application to request product status, product usage or job accounting data from the product through the Internet. The product provides data in XML to the application whenever requested. HP provides a Software Development Kit to facilitate the development of such applications.

Check usage statistics

There are two ways of checking your product's usage statistics.

NOTE: The accuracy of the usage statistics is not guaranteed.

- From the Embedded Web Server, go to the **Main** tab and select **History** > **Usage**.

- From the front panel, press ⬛, then ⬛, then **Setup** > **Internal prints** > **User information prints** > **Print usage report**.

Check usage statistics for a job

You can use the Embedded Web Server to check usage statistics for a particular job: go to the **Main** tab and select **History** > **Accounting**.

NOTE: The accuracy of the usage statistics is not guaranteed.

Request accounting data by E-mail

1. Obtain the IP address of the outgoing mail server (SMTP) from your IT department; this is required in order to send e-mail messages.

2. Ensure that the outgoing e-mail server is configured to enable relaying of e-mail messages that the product will send.

3. Open your Web browser and connect to the product's Embedded Web Server.

4. Select the **Setup** tab.

5. From the Configuration menu in the left-hand column, select **Date & Time**.

6. Ensure that the product's date and time have been set correctly.

7. From the Configuration menu, select **E-mail server**..

8. Enter the IP address of the outgoing mail server (SMTP).

9. Specify an e-mail address for the product. The latter does not need to be a valid e-mail address, because the product will not receive messages; but it should have the form of an e-mail address. It serves to identify the product when it sends e-mail messages.

10. From the Configuration menu, select **Printer settings**.

11. In the Accounting section, if you set **Require account ID** to **On**, then every time someone sends a print job to the product, he or she must provide an account ID: for example, an ID corresponding to his or her department or to a specific project or client. If someone sends a job without providing an account ID, the product will hold the unidentified job in the queue without printing it until an account ID is provided.

    If you set **Require account ID** to **Off**, then the product will print all jobs whether or not they have an account ID.

12. Set **Send accounting files** to Enabled.

13. Set **Send accounting files to** to the e-mail address (or addresses) to which you want the accounting information sent. This may be an address that you have created specifically to receive automatically generated messages from the product.

14. Set **Send accounting files every** to the frequency with which you want the information sent, choosing a specific number of days or prints.

15. You may want to set **Exclude personal information from accounting e-mail** to **On**, so that the accounting messages will not contain personal information. If this option is **Off**, information such as user name, job name, and account ID will be included.

When you have completed the above steps, the product will send accounting data by E-mail with the frequency that you specified. The data are provided in XML and can easily be interpreted by a third-party program. The data provided on each print job include when the job was submitted, when the job was printed, the printing time, the type of image, the number of pages, the number of copies, the paper type and size, the amount of each color of ink used and various other attributes of the job. Accounting data are also provided on scan and copy jobs.

You can download an Excel template from HP's Web site (http://www.hp.com/go/designjet/accounting/) that will enable you to display the XML data more readably in the form of a spreadsheet.

Analysis of the accounting data will enable you to bill customers precisely and flexibly for the use of your product. You can, for instance:

● Bill each customer for the total amount of ink and paper used by that customer over a particular period.

● Bill each customer separately per job.

● Bill each customer separately for each project, broken down by job.

7 The ink system

Ink system components

Ink cartridges

The printer's six ink cartridges provide magenta, light magenta, black, yellow, light cyan and cyan ink to the printheads. Each cartridge has a capacity of 775 ml.
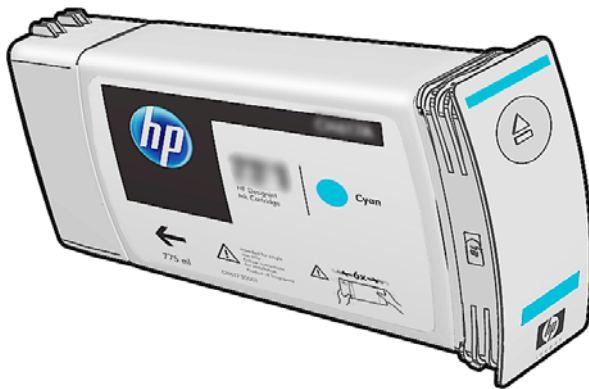
Ink cartridges require no maintenance or cleaning, but must be shaken before installation. High-quality printing results continue even when the ink levels are getting low.

⚠ **CAUTION:**   Avoid touching pins, leads, and circuitry when handling ink cartridges because these elements are sensitive to electrostatic discharge. Such devices are called ESD-sensitive devices. See Glossary on page 161. Electrostatic discharges are one of the main hazards to electronics products. This type of damage can reduce the life expectancy of the device.

Printheads

The printheads deposit ink on the substrate. Each printhead is connected to two ink cartridges. For example, the printhead shown below draws ink from the light magenta and magenta cartridges.
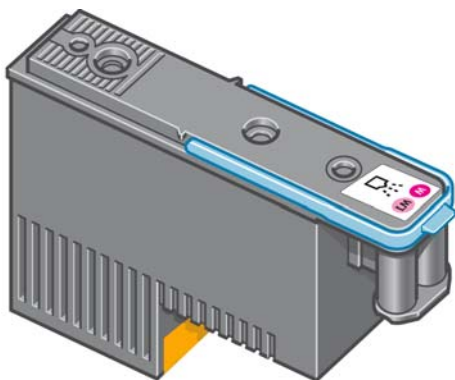
The printheads are extremely durable and do **not** need to be replaced every time an ink cartridge is replaced. They provide excellent results even when the ink cartridges contain a low level of ink.

To maintain optimum print quality, the printheads are automatically tested at regular intervals, and automatically serviced when necessary. This takes a little time and can occasionally delay printing.

When a printhead eventually needs to be replaced, the front panel will display a message.

⚠ **CAUTION:** Avoid touching pins, leads, and circuitry when handling printheads because these elements are sensitive to electrostatic discharge. Such devices are called ESD-sensitive devices. See Glossary on page 161. Electrostatic discharges are one of the main hazards to electronics products. This type of damage can reduce the life expectancy of the device.

Printhead cleaning kit

The printhead cleaning kit contains the printhead cleaning cartridge, the ink funnel and the ink filter.

Printhead cleaning cartridge

The printhead cleaning cartridge cleans and maintains the printheads, and seals the printheads when they are not in use to prevent them from drying out.
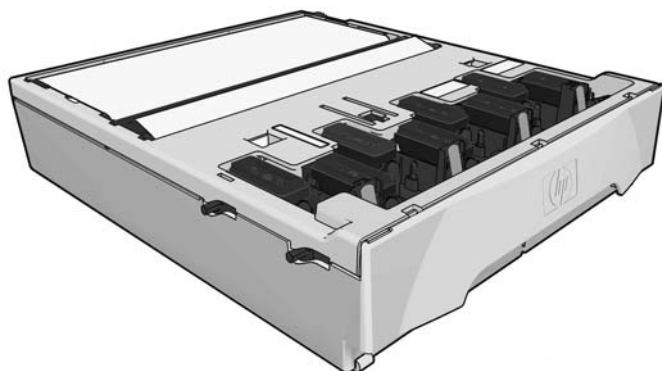
The cartridge contains a roll of cloth, which is used to clean the printheads. You are notified when 92% of the roll has been used, after which the cartridge should continue to function for about another 140 m^2 (1500 ft^2) of printed area. A new roll lasts for about 1850 m^2 (20000 ft^2) of printed area.

📝 **NOTE:** These figures can vary considerably depending on the image density, the print mode, and the ambient temperature. The cloth will be exhausted much faster with a high-density print, many passes, a hot environment, and if you have selected the **Extra PH cleaning** option in the front panel because of a print-quality problem (see Horizontal banding on page 125). Remember to turn this option off when you no longer need it.

📝 **NOTE:** The printhead cleaning cartridge is checked to detect end of roll when the printer is turned on and at the end of each print job.

The printer will refuse to start a print job if it detects the end of the cleaning roll. You should then replace the printhead cleaning cartridge with a new one.
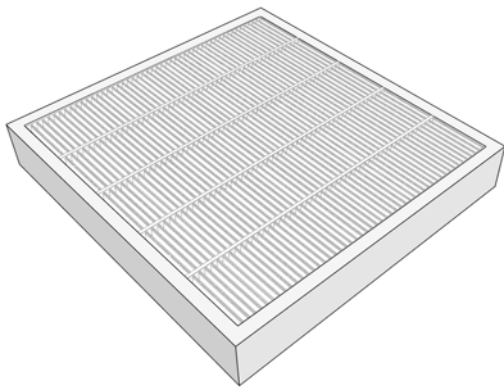
Ink funnel

The ink funnel collects waste ink produced during printhead servicing. It is important that this funnel is installed, as it prevents significant deposits of ink over various other printer parts.

From the ink funnel, the waste ink passes through the ink tube assembly into the printhead cleaning container.
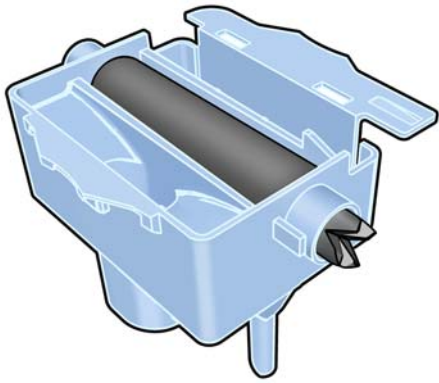
Ink filter

The ink filter filters tiny droplets of waste ink before they pass into the printhead cleaning container.
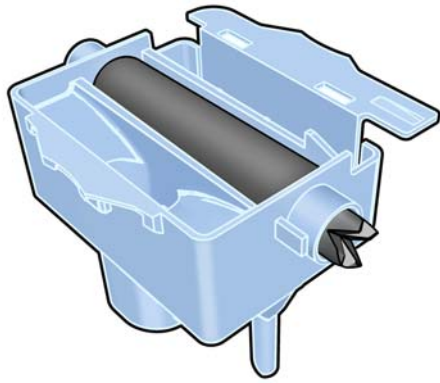

Printhead cleaning container

The printhead cleaning container stores waste ink collected by the ink funnel.

The ink maintenance kit

The ink maintenance kit contains the following components.

● The ink funnel, which collects tiny droplets of waste ink produced during printhead servicing.
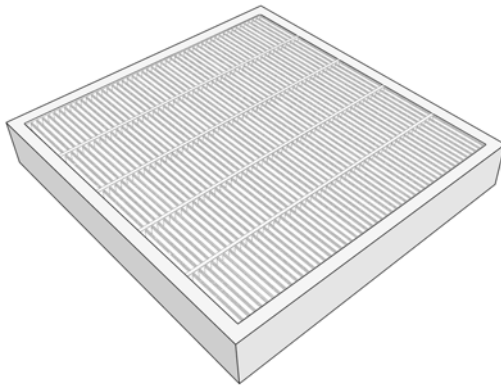
- The ink tube assembly, which passes tiny droplets of waste ink collected by the ink funnel to the printhead cleaning container

If the printer asks you to replace the ink tube assembly, you should replace the ink funnel and the ink filter at the same time.

- The ink filter, which filters tiny droplets of waste ink before they pass into the printhead cleaning container.

These components are designed to keep the printer's waste ink from damaging the printer and dirtying the environment.

In order to keep the printer and its surroundings clean, you must ensure that these components are correctly installed and maintained. In particular, these steps are essential:

1. Connect the ink tube assembly.

2. Insert the ink funnel.

3. Insert the ink filter and close the filter box.

4. Install the printhead cleaning container.

If the printer continues operating while these components are incorrectly installed or incorrectly connected, HP will not be responsible for any resulting damage or cleaning expenses.

The printer displays a message on the front panel if it detects any problem with these components.

Order ink supplies

You can order the following ink supplies for your printer.

Table 7-1 Ink cartridges

Cartridge	Capacity (ml)	Part number
HP 792 Black Latex Designjet Ink Cartridge	775	CN705A
HP 792 Cyan Latex Designjet Ink Cartridge	775	CN706A
HP 792 Magenta Latex Designjet Ink Cartridge	775	CN707A
HP 792 Yellow Latex Designjet Ink Cartridge	775	CN708A
HP 792 Light Cyan Latex Designjet Ink Cartridge	775	CN709A
HP 792 Light Magenta Latex Designjet Ink Cartridge	775	CN710A

Table 7-2 Printheads

Printhead	Part number
HP 792 Yellow and Black Designjet Printhead	CN702A
HP 792 Cyan and Light Cyan Designjet Printhead	CN703A
HP 792 Magenta and Light Magenta Designjet Printhead	CN704A

Table 7-3 Waste management system

Kit	Part number
HP 792 Designjet Printhead Cleaning Kit	CR278A
HP 792 Designjet Ink Maintenance Kit	CR279A
HP 789/792 Designjet Printhead Cleaning Container	CH622A

8 Print options

Printer states

The printer may be in any one of the following states; some of them require waiting.

- **Ready (cold)**: The printer is powered on but has not printed yet, and the heaters are not turned on.

- **Preparing to print**: The printer is warming up the heaters and preparing the printheads to print. This takes 1 to 8 min.

- **Ready for substrate**

- **Ready for side A/B**

- **Printing**

- **Printing side A/B**

- **Curing**: This takes 1.5 to 5 min.

- **Finishing**: The printer is cooling down and preparing for stand-by. This takes 0.5 to 5 min.

If jobs of the same print mode as the already-printed file are sent while the printer is **Curing** (if the cutter is not enabled) or **Finishing**, the printer goes to **Preparing to print**.

To save time between prints, concatenate jobs with the same print mode (same number of passes) and turn the cutter off to skip the **Curing** and **Finishing** states. You can also use nesting to print several jobs in the same workflow.

Even if the cutter is on or successive jobs use different print modes, it is better to print them all together without delays to minimize the time spent in **Preparing to print**.

Change margins

The printer margins determine the area between the edges of your image and the edges of the substrate.

The margins for a particular print job are selected in the RIP software; if the job exceeds the substrate width, it will be clipped.

The front panel offers additional settings for the bottom margin: see Table 19-5 Margins on page 156. These settings apply only to single prints when the cutter is not in use. The bottom margin is not applied between several prints sent at the same time, nor during double-sided printing.

To set the bottom margin at the front panel, press 🔲, then 🔧, then **Substrate** > **Substrate handling options** > **Extra bottom margin**.

📝 **NOTE:** The extra bottom margin set in the front panel is applied in addition to the bottom margin selected in the RIP.

Request the printer's internal prints

The internal prints provide various kinds of information about your printer. Request these prints from the front panel, without using a computer.

Before requesting any internal print, make sure that substrate is loaded and that the **Ready** message appears on the front-panel display.

To print an internal print, press ![info icon], then ![wrench icon], then **Setup** > **Internal prints**, then select the type of internal print that you want.

The following internal prints are available:

- Usage report: Shows estimates of the total number of prints, number of prints by substrate family, number of prints by print-quality option, and total amount of ink used per color. The accuracy of these estimates is not guaranteed.

- Service information: Provides information that service engineers require.

9 Accessories

Order accessories

The following accessories can be ordered for your printer.

☼ **TIP:** Spare spindles ease the process of switching between different substrates.

| Name	Product number
HP Designjet Soft Media Loading Accessory 104-in	CZ278A
HP Designjet Soft Media Loading Accessory 61-in	CR765A
HP Designjet L28500 104-in Printer 3-in Spindle	CZ277A
HP Designjet L2x500 User Maintenance Kit	CQ201A

10 Printer status

Check printer status

The front panel and the Embedded Web Server both display the status of the printer, the loaded substrate and the ink system.

Check the status of the ink system

1. Access the Embedded Web Server (see above).

2. Go to the Supplies page on the **Main** tab.
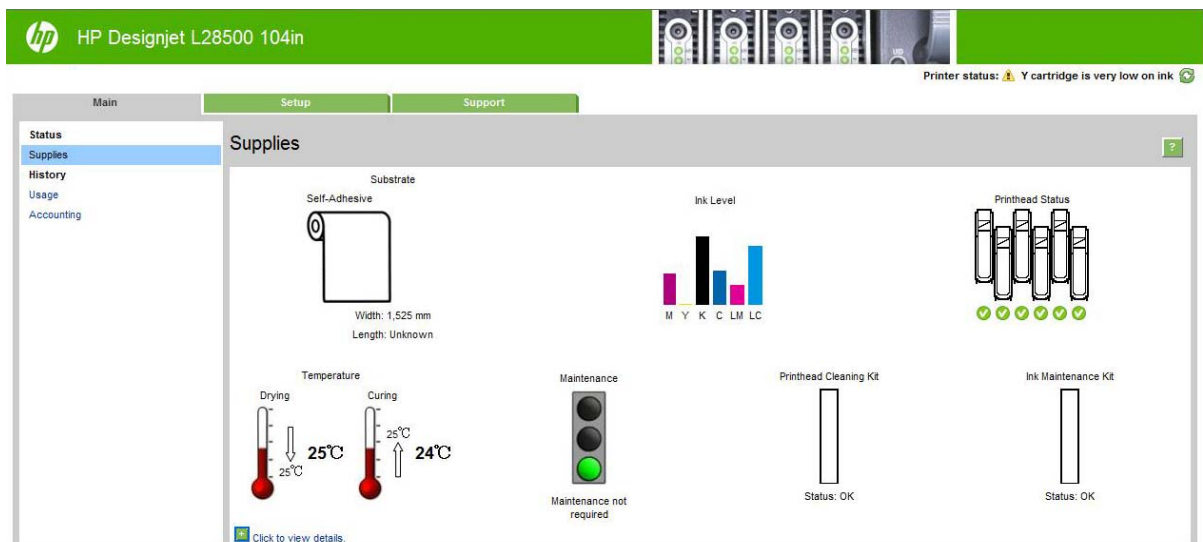
The Supplies page shows you the status of the loaded substrate, the ink cartridges, the printheads, the heaters, the printhead cleaning kit, the ink funnel, and the ink maintenance kit.

The traffic light shows whether maintenance is required. For further information, click **View details**.

Check the status of the ink cartridges

You can see the ink levels in your ink cartridges on the front panel's home screen. For more details about any particular ink cartridge, press **Ink information** and then press the color of the cartridge. The following information is shown.

- Color

- Status

- Ink level

- Capacity

- Product name

- Product number

- Serial number

- Expiration date

- Warranty status

- Manufacturer

You can also view the status of the ink cartridges in the Embedded Web Server.

Check the status of a printhead

The printer automatically checks and services the printheads after each print. Follow these steps to get more information on your printheads.

1. On the front panel's home screen, press ▣▣.

2. Select the printhead for which you want to see information.

3. The front panel shows the following information:

    - Status

    - Color

    - Product name

    - Product number

    - Serial number

    - Ink fired

    - Warranty status

You can also use the Embedded Web Server to check the printhead status and the warranty status.

📝 **NOTE:** If the warranty status is **See warranty note**, this indicates that non-HP ink is being used. Printer service or repairs required as a result of using "non-HP" ink are not covered under warranty. See the *Legal Information* document for detailed warranty implications.

Check the file system

It is possible to check the integrity of the file system on the printer's hard disk, and automatically correct any errors. You are recommended to do this about once every six months, or if you notice any trouble in accessing files on the hard disk.

To execute the file system check, go to the front panel and press ▣, then 🔧, then **Preventive maint. tasks** > **File system check**.

If the printer is aware of damage to the file system, for instance after a severe software problem, it may start a file system check automatically. This can take about half an hour.

Printer alerts

The printer can communicate two types of alerts:

- **Errors:** When the printer is unable to print.

- **Warnings:** When the printer needs attention for an adjustment, such as a calibration, preventive maintenance or ink cartridge replacement.

Printer alerts appear in the front panel and in the Embedded Web Server. In some cases, the printer may also make an audible beep to draw your attention to the alert. If you do not want to hear the beeps, you can disable them from the front panel.

- **Front-panel display:** The front panel shows only one alert at a time, which is judged to be the most important. It generally requires the user to press the OK key for confirmation, but in the case of a warning, it disappears after a while. Some alerts reappear when the printer is idle and there is nothing more important to report.

- **Embedded Web Server:** The alert displayed in the front panel also appears in the top right corner of the Embedded Web Server window.

An alert may require you to perform a maintenance operation; see Hardware maintenance on page 89.

The following alerts require a service engineer:

- **Service Maintenance Kit 1**

- **Service Maintenance Kit 2**

- **Service Maintenance Kit 3**

11 Firmware update

The printer's various functions are controlled by software that resides in the printer, also known as firmware.

From time to time, firmware updates from Hewlett-Packard become available. These updates increase the printer's functionality and enhance its features.

When installing the printer for the first time you may be asked to update the firmware. For this purpose, you need a USB flash drive with the following specifications:

- USB 2.0-compatible
- 2 GB capacity
- FAT preformatted
- No hardware encryption

Firmware update using a USB flash drive

1. Download the firmware update from http://www.hp.com/go/L28500/support/ and store it on the USB flash drive.

   IMPORTANT: The USB flash drive should contain only one firmware file (.fmw) in the drive's root folder, and no other files.

2. Connect the USB flash drive to the USB connector at the rear of the printer and follow the instructions on the front panel.

Subsequent firmware updates can be installed in your printer in the same way, or by using the printer's Embedded Web Server.

Firmware update using the Embedded Web Server

1. To access the Embedded Web Server from any computer, see Check printer status on page 83.

2. In the Embedded Web Server, select the **Setup** tab and then **Firmware update**.

3. Follow the on-screen instructions to download the firmware file and store it on your hard disk. Then select the downloaded .fmw file and click **Update**.

   If you experience very slow progress while uploading the firmware file to the printer, the reason could be that you are using a proxy server. In that case, try bypassing the proxy server and accessing the Embedded Web Server directly.

   - In Internet Explorer 6 for Windows, go to **Tools** > **Internet Options** > **Connections** > **LAN Settings**, and select the **Bypass proxy server for local addresses** check box. Alternatively, for more precise

control, click the **Advanced** button and add the printer's IP address to the list of exceptions, for which the proxy server is not used.

- In Firefox 3.0 for Windows, go to **Tools** > **Options** > **Network** > **Connection** > **Settings**, and select the **Direct connection to the Internet** check box. Alternatively, when the **Manual proxy configuration** check box is selected, add the printer's IP address to the list of exceptions, for which the proxy server is not used.

- In Firefox 2.0 for Linux, go to **Edit** > **Preferences** > **Network** > **Connection** > **Settings**, and select the **Direct connection to the Internet** check box. Alternatively, when the **Manual proxy configuration** check box is selected, add the printer's IP address to the list of exceptions, for which the proxy server is not used.

12 Hardware maintenance

For the tasks in this chapter, you may need the User Maintenance Kit that was provided with your printer.

Ink system tips

For best results, always follow these guidelines:

- Follow the instructions on the front panel during installation.

- Allow the printer and the printhead cleaning cartridge to clean the printheads automatically.

- Avoid unnecessary removal of the ink cartridges and printheads.

- The ink cartridges should never be removed while the printer is printing. They should be removed only when the printer is ready for you to replace them. The front panel guides you through the replacement procedure.

- Make sure that you comply with all applicable laws and regulations when disposing of ink system consumables.

NOTE: Shake the ink cartridges and printheads vigorously before installing them.

Align the printheads

The printer performs printhead alignment whenever printheads are replaced. If no substrate is loaded when a printhead is replaced, the printer will perform the alignment the next time you load substrate.

You may also be recommended to align the printheads to solve a print-quality problem.

Automatic alignment

First make sure that you have a roll of opaque, white substrate loaded in the printer. Colored substrates, glossy canvas, coarse textiles, and transparent materials such as translucent bond, clear film, tracing substrate and vellum are not suitable for automatic printhead alignment. For these substrates, you should align the printheads manually (see Manual alignment on page 90) or perform the automatic alignment on a supported substrate first, then change to the special substrate. Alignment settings are retained through substrate changes until a new printhead alignment is performed.

To request printhead alignment from the front panel (if the alignment is not performed automatically), press
, then , then **Ink** > **Image-quality maintenance** > **Align printheads** > **Auto PH alignment**.
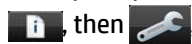
To request printhead alignment from the Embedded Web Server, select the **Setup** tab, then select **Printhead alignment** > **Automatic printhead alignment** > **Print**.

The process takes about 10 minutes and starts immediately, unless an image is currently being printed. If a print job is in process, the alignment will be done as soon as the current print job is finished.

Manual alignment

To request a manual printhead alignment from the front panel, press [i], then [wrench], then **Ink** > **Image-quality maintenance** > **Align printheads** > **Manual PH alignment** > **Print alignment pattern**.

To request manual printhead alignment from the Embedded Web Server, select the **Setup** tab, then select **Printhead alignment** > **Manual printhead alignment** > **Print**.

The printer prints 18 rows labelled from A to R. Inspect the print and write down the number of the straightest line in each row (for example, A:9).
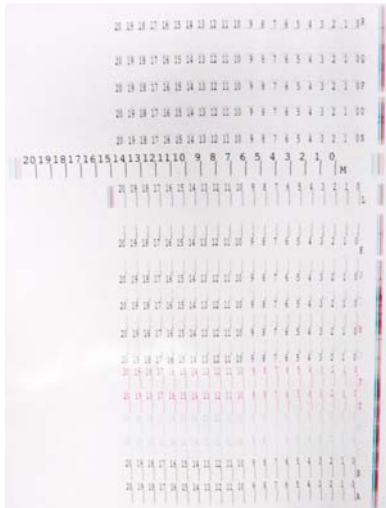
When you have done this, enter the correction values into the front panel or the Embedded Web Server.

To enter the correction values in the front panel, press [i], then [wrench], then **Ink** > **Image-quality maintenance** > **Align printheads** > **Manual PH alignment** > **Enter correction values**. Enter each value into the window labelled with the same letter as the corresponding pattern.

To enter the correction values in the Embedded Web Server, select the **Setup** tab, then select **Printhead alignment** > **Manual printhead alignment**, and enter each value into the window labelled with the same letter as the corresponding pattern.

Clean and lubricate the carriage rail

NOTE: Under some workflows, or/and site conditions such as in warm ambient temperature, which are above the printer's operation specification (above 30℃(86℉)), or if there is significant ambient dust; the lubrication of the slider rods can be reduced or affected, which can in turn affect the performance of the printer.

NOTE: A visual explanation of the procedure to clean and lubricate the carriage rail can be found here: http://www.hp.com/go/L28500/videos

1. At the front panel, press [i], then [wrench], then **Preventive maint. tasks** > **Clean and lubricate the carriage rail**.
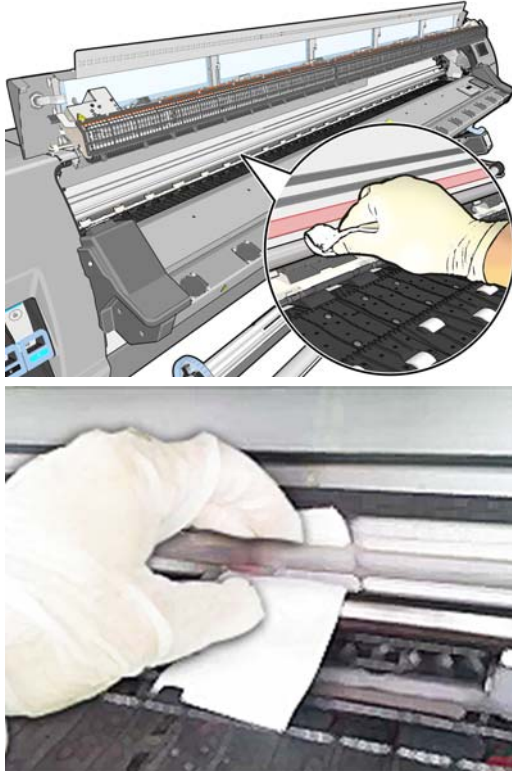
2. Unlock and open the window.

3. Clean the carriage rail using a lint-free cloth dampened with 95% ethanol. Take care to clean the whole rail, including the part under the left cover.

NOTE: 95% ethanol is not provided in the Maintenance Kit.

⚠ **CAUTION:** Ethanol is highly flammable. Observe the manufacturer's safety precautions.

CAUTION: Do not use commercial cleaners or abrasive cleaners.

**CAUTION:** While cleaning, be careful not to damage the metal strip located on top of the rail.

4. Wait until the rail is dry, then close the window. The carriage moves to the center of the printer so that you can reach the part of the rail under the right cover.

5. Unlock and open the printer window.

6. Clean the carriage rail area under the right cover as described in step 3.

7. Take the bottle of oil from the Maintenance Kit that is supplied with your printer (a replacement kit can be ordered if necessary).

8. Deposit a very thin zig-zag trickle of oil along the rail on both sides of the carriage. There is a video showing the process here: http://www.hp.com/go/L28500/videos
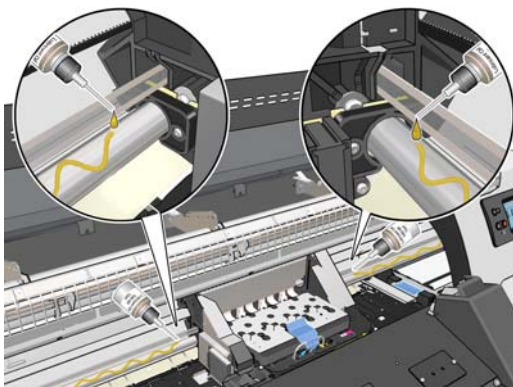
> **NOTE:** While lubricating, be careful not to drop oil on the metal strip located on top of the rail.

9. Clean the substrate jam reflector using a lint-free cloth dampened with distilled water. If you find dried ink that you cannot remove, try using a lint-free cloth dampened with 95% ethanol.
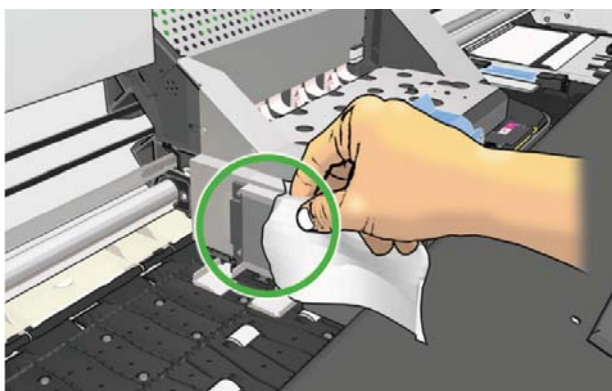

10. Press **OK** at the front panel.

11. Close and lock the window.

12. The Carriage Assembly moves along the rail to distribute the oil along the rail.

13. The Front Panel prompts for confirmation that the lubrication processes has been done. Press **OK** to confirm.

Clean the electrical connections on a printhead

It is possible that the printer will not recognize a printhead after it has been installed. This can happen when ink builds up on the electrical connections between the printhead and the printhead carriage. Under these circumstances, HP recommends that you clean the electrical connections on the printhead. However, routine cleaning of the connections when no problems are apparent is *not* recommended.

A carriage interconnect wiper is included with your printer in the User Maintenance Kit.
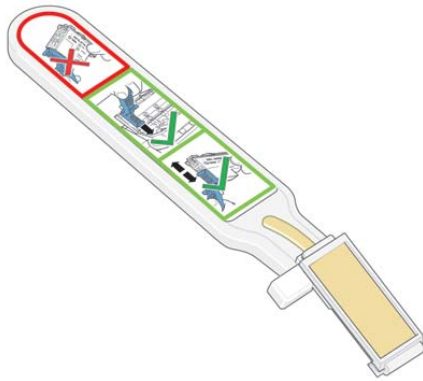
Use this to clean the electrical interconnects on both the printhead carriage and the printhead if the **Reseat** or **Replace** message persists next to the printhead on the front-panel display.

1. Remove a new pre-moistened replacement sponge from its pouch.
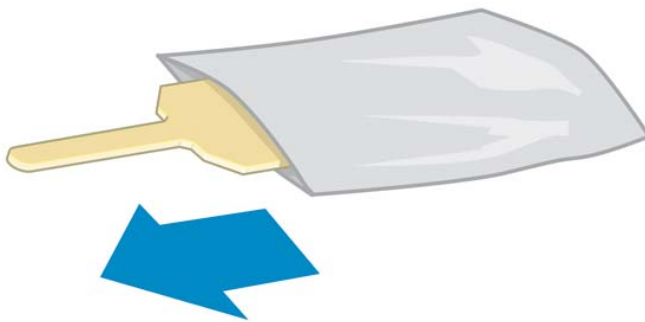
A supply of sponges is included in the box with the wiper. If all sponges have been used, more can be obtained by calling your service representative.
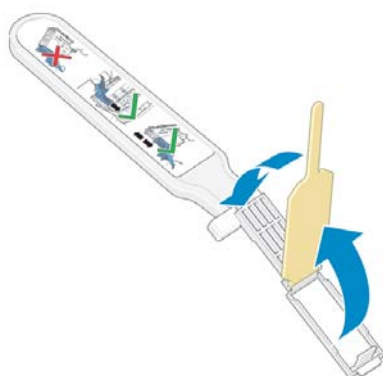
2. Open the carriage interconnect wiper.
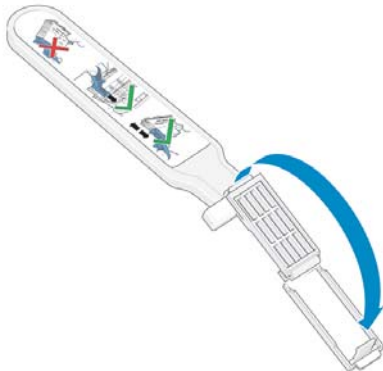
3. Load the sponge by positioning the sponge on the face of the carriage interconnect wiper with the shorter tab in the locating slot.
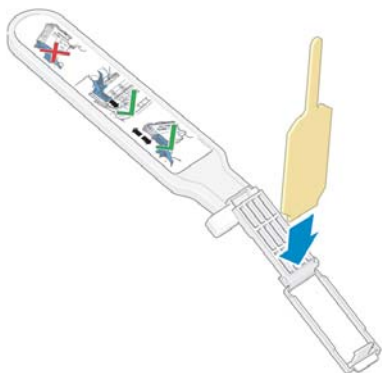
4. Close the carriage interconnect wiper, trapping the sponge in place.

5. Open the printhead carriage latch and extract the printhead that is causing the problem, as indicated on the front panel. See Replace a printhead on page 110.

6. Insert the carriage interconnect wiper into the printhead slot at the back. Wipe the electrical contacts by inserting the tool between the electrical connections at the back of the slot and the steel spring, with the sponge facing away from you and towards the electrical contacts. Try to avoid picking up any ink deposit that may have accumulated on the bottom surface of the slot.

⚠ **CAUTION:** If the carriage remains in the central part of the printer for more than 7 minutes, it attempts to return to its home position to the right.
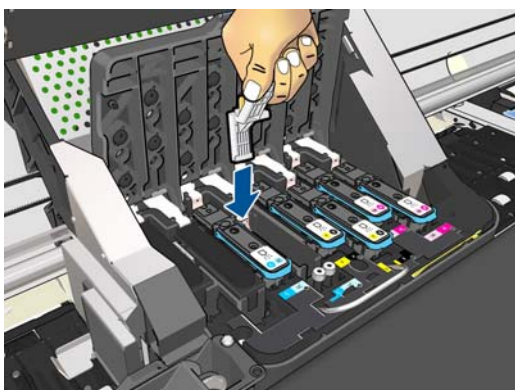
7. Rub the sponge against the contacts with a *light* force along the entire depth of the flex connector, inserting the wiper as far as allowed by the mechanical stop on the tool.
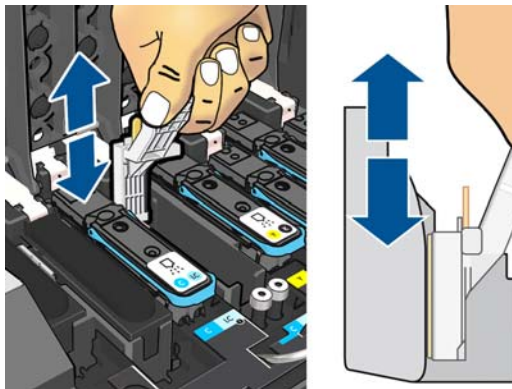
8. Take special care to clean all contacts thoroughly, including the ones at the lowest point of the connector.
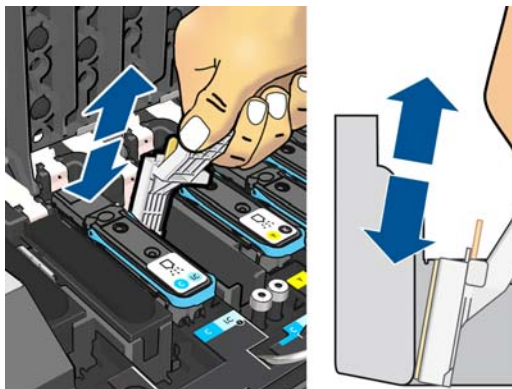

9. Using the same sponge, clean the lower strip of electrical contacts on the printhead (unless the printhead is new). Avoid touching the upper set of electrical contacts.
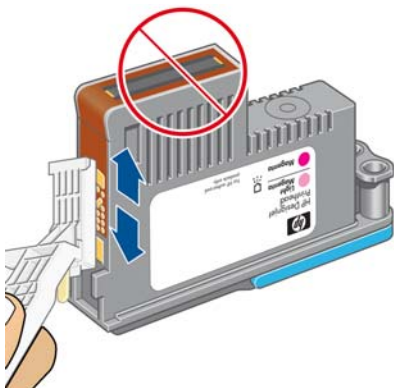

⚠ **CAUTION:**   Do not touch the surface of the printhead that contains the nozzles, because the nozzles are easily damaged.

10. After waiting a few moments to allow both connectors to dry, replace the printhead into the printhead carriage. See Replace a printhead on page 110.
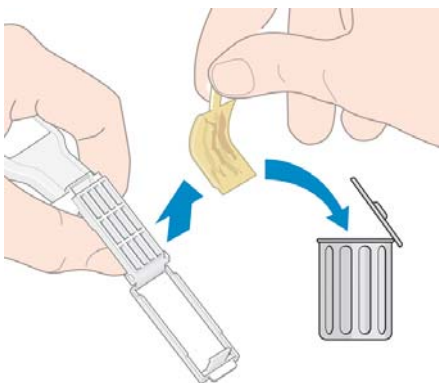
11. After completing the cleaning process, open the carriage interconnect wiper by pulling on the sponge tab.
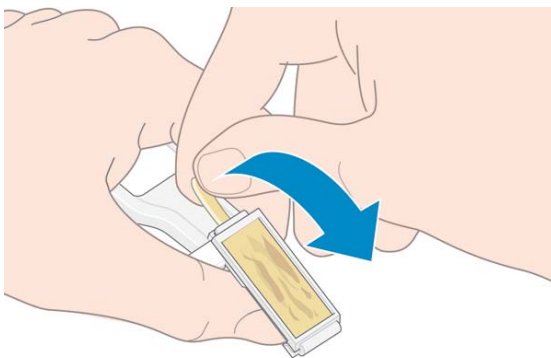
12. Remove the soiled sponge from the carriage interconnect wiper.
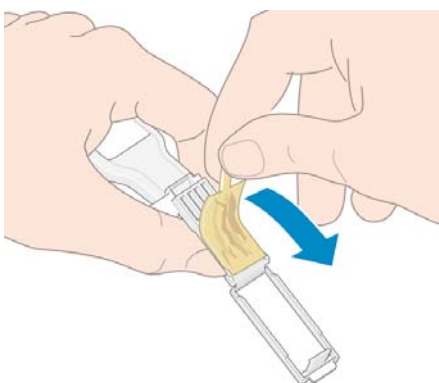
13. Dispose of the soiled sponge in a safe place to prevent the transfer of ink onto hands and clothing.

If the front panel continues to show the **Reseat** or **Replace** message, replace the printhead or call your service representative.

Clean the exterior of the printer

Use a damp sponge or a soft cloth and a mild household cleaner such as non-abrasive liquid soap to clean the outside of the printer and all other parts of the printer that you regularly touch as part of normal operation (for example, ink cartridge drawer handles).

There may be some dampness from condensation under the fans of the curing module, which should be wiped with a dry cloth.

WARNING! To avoid an electric shock, make sure that the printer is turned off and unplugged before you clean it. Do not let water get inside the printer.

CAUTION: Do not use abrasive cleaners on the printer.

Clean the platen

You should clean your printer's platen every few months, or when necessary.

NOTE: If you print on wide substrate after having printed on narrower substrate, you may find that the left side of the platen has become dirty. If this contaminated section of the platen is not cleaned, it could leave marks on the back of the substrate.

CAUTION: Be careful not to damage the substrate-advance sensor when cleaning the platen. The sensor is the very small rectangular window (less than 1 cm^2) found close to the third pinchwheel from the right. See Clean the substrate-advance sensor window on page 100.

Follow these instructions to clean the platen.

1. Unload all substrate from the printer. See Unload a roll from the printer on page 35.

2. Turn off the printer and wait until it has cooled down, then unlock and open the printer window.
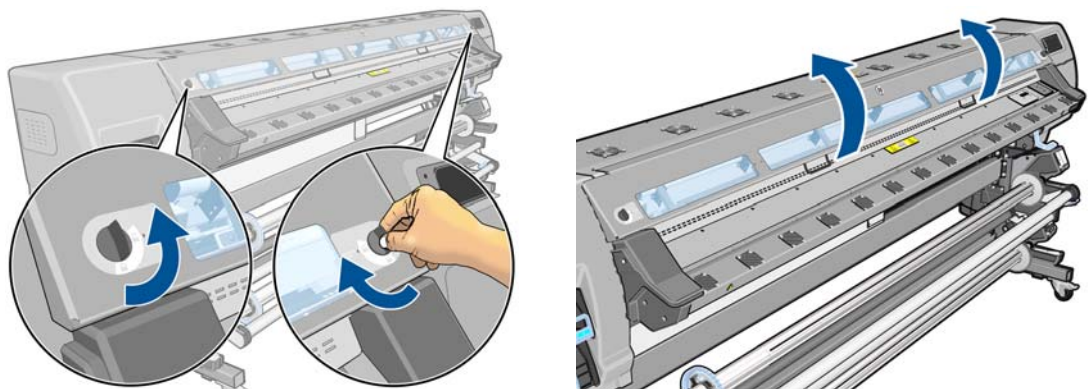
3. Use a clean, absorbent lint-free cloth to thoroughly wipe any wet ink from the cutter grove, cutter ramp and platen.

4. With a dry brush, remove dry, loosened ink deposits from the cutter groove and cutter ramp. A brush is available in the User Maintenance Kit.
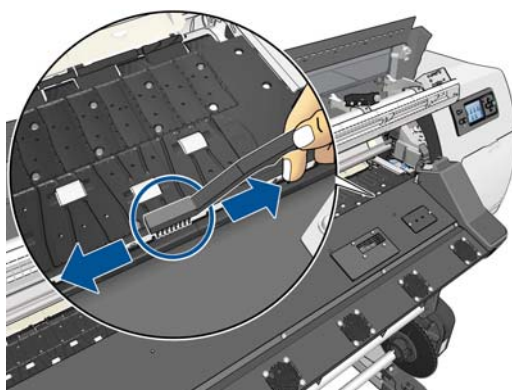
**5.** With the same dry brush, remove dry, loosened ink deposits from the platen surface.
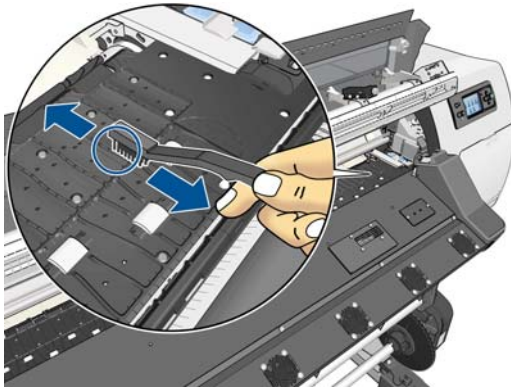
6. Slightly dampen the used cloth with 95% ethanol to wipe the remaining dry ink deposits from the platen.

NOTE: 95% ethanol is not provided in the User Maintenance Kit.

CAUTION: Ethanol is highly flammable. Observe the manufacturer's safety precautions.

CAUTION: Do not use commercial cleaners or abrasive cleaners. Do not wet the platen directly, because you will leave too much moisture behind, which could damage the substrate advance sensor.
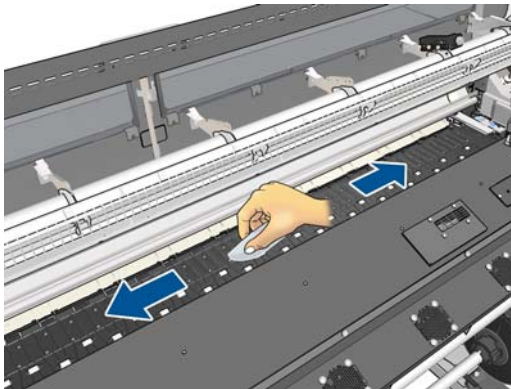
7. Use the damp cloth to remove remaining dry ink deposits from the cutter ramp.
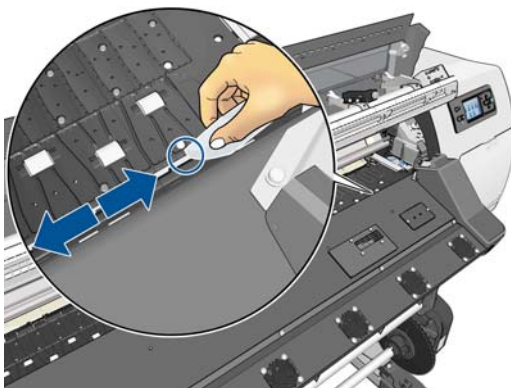
8. Use a dry cloth to clean the exposed part of the wheels. Ideally, you should clean the entire circumference of these wheels.
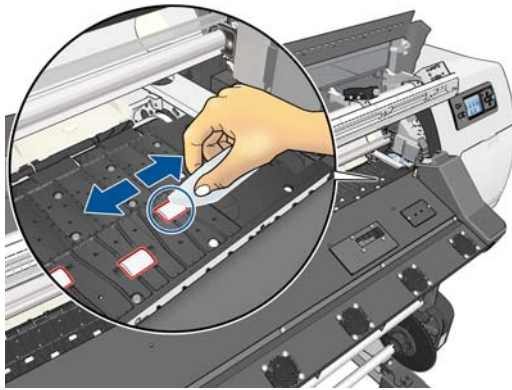
9. Remove the closed 95% ethanol container and the cloth from the vicinity of the printer.

10. Wait 3 or 4 minutes to let the ethanol evaporate, before turning on the printer and reloading the substrate.

11. With a 1 mm diameter pin ensure that the vacuum holes are not obstructed, especially the holes that are covered by the most-used substrate sizes.

Clean after porous substrates

If you print on a porous substrate (through which ink can pass), you should clean the platen immediately after each printing session. Do not, for instance, leave the printer overnight or load a new roll without cleaning the platen first.

When printing on a textile or thin substrate, you may find condensation in the input area of the printer. You are recommended to wipe it away with a dry cloth, at least before loading a new roll.
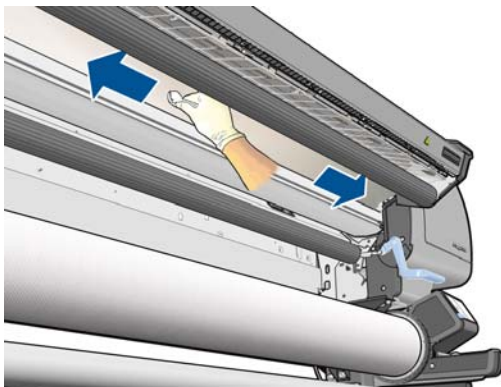
Clean (recover) the printheads

To clean the printheads (which often enables them to recover from problems), go to the printer's front panel and press ![icon], then ![icon], then **Ink** > **Image-quality maintenance** > **Clean printheads**. Specify which printheads you would like to clean. You can clean all of the printheads or only some of them. Select from the following options.

●   Print test plot

●   Clean all

●   Clean LC-C

- Clean Y-K

- Clean LM-M

Cleaning all printheads takes about 5 minutes. Cleaning any two printheads takes about 3 minutes.

📝 **NOTE:** Cleaning all printheads uses more ink than cleaning a single pair.

Clean the substrate-advance sensor window

The substrate-advance sensor is the very small rectangular window (less than 1 square centimeter in size) close to the third pinchwheel from the right.

HP recommends that you clean the substrate-advance sensor window whenever you clean the print platen and if you are experiencing print quality issues.

1. Unload the substrate by using the front panel procedure. See Unload a roll from the printer on page 35.

2. Turn off the printer and wait until it has cooled down.

3. Wipe the sensor with one of the cotton swabs provided in the User Maintenance Kit, to remove wet ink.
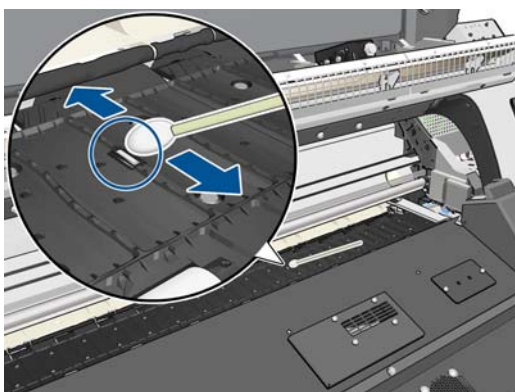
4. Wipe the sensor with one of the cotton swabs provided in the User Maintenance Kit, slightly dampened with 95% ethanol, to remove dried ink.

   📝 **NOTE:** 95% ethanol is not provided in the User Maintenance Kit. Please follow the manufacturer's safety precautions when handling ethanol.

   If the sensor window is heavily coated with dried ink, you may need to apply some pressure while wiping, helping the cotton to absorb the ink. Continue cleaning with fresh swabs until the cotton stays clean and the sensor window looks clean. When reflecting ambient light, a clean sensor shows a blue-colored reflection that should extend uniformly across its whole surface. You can see this reflection by moving closer and slightly changing your angle of view.

5. Remove the closed 95% ethanol container and the cotton swabs from the vicinity of the printer.

6. Wait three or four minutes to let the ethanol evaporate, before turning on the printer and reloading the substrate.

Maintain the ink cartridges

During the normal lifetime of a cartridge, no specific maintenance is required. You should replace a cartridge when it has reached its expiration date. See the ink cartridge information on the front panel for the expiration date.

Move or store the printer

If you need to move your printer or store it for an extended period of time, prepare it correctly to avoid possible damage.

1. Do not remove the ink cartridges, printheads or printhead cleaning cartridge.

2. Make sure that no substrate is loaded.

3. Make sure that the printhead carriage is located in the service station (at the right end of the printer).

4. Make sure that the **Ready** message appears on the front panel.

5. Turn off the power by using the Power button on the front panel.

6. Also switch off the power switch at the rear of the printer.

7. Disconnect any cables that connect the printer to a network, a computer, or a scanner.

8. If you have a take-up reel installed, remove the take-up reel sensor and cable-housing unit from the foot of the printer stand. When reinstalling the housing unit, make sure that the wheel on the foot of the printer stand is pointing forward.

9. If you intend to turn the printer upside down or on its side, first remove the waste management system (see Replace the ink maintenance kit on page 105 and Replace the printhead cleaning kit on page 116).

10. For correct environmental storage conditions, see Environmental specifications on page 157.

NOTE: If the printer or ink cartridges are moved from a cold location to a warm and humid location, water from the atmosphere can condensate on the printer parts and cartridges and can result in ink leaks and printer errors. In this case, HP recommends that you wait at least 3 hours before turning on the printer or installing the ink cartridges, to allow the condensate to evaporate.

Replace an ink cartridge

Ink cartridges should be replaced for the following two reasons:

- The ink cartridge is very low and you want to replace it with a full cartridge for unattended printing. You can use the remaining ink in the first cartridge at a more convenient time.

- The ink cartridge is empty or faulty, and you must replace it to continue printing.

CAUTION: The procedure to remove an ink cartridge must be initiated from the front panel. Do not remove an ink cartridge until the front panel prompts you. If you remove an ink cartridge incorrectly, the printer may subsequently reject that cartridge.

CAUTION: Remove an ink cartridge only if you are ready to insert another one.

CAUTION: Avoid touching pins, leads and circuitry when handling ink cartridges because these elements are sensitive to electrostatic discharge, which can reduce the life expectancy of the device.

WARNING! Make sure that the printer wheels are locked (the brake lever is pressed down) to prevent the printer from moving.

Remove an ink cartridge

1. On the printer's front panel, press **Ink information** > **Options** > **Replace ink cartridges**.
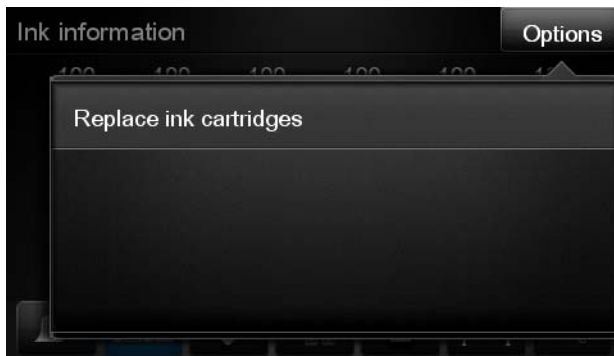
Alternatively, press ![info icon], then ![wrench icon], then **Ink** > **Replace ink cartridges**.

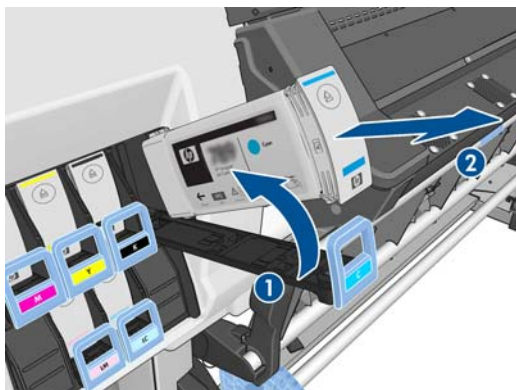2. Grip the blue tab in front of the cartridge that you want to remove.

3. Pull the blue tab down and then pull it outwards, towards you.


4. The cartridge comes out, in its drawer.

5. Lift the cartridge out of its drawer.

NOTE: Avoid touching the end of the cartridge that is inserted into the printer, because the connection might be coated with ink.

NOTE: If necessary, store a partially-used ink cartridge in the same position as if it were inserted in the printer. Avoid using a partially-used cartridge that has been stored on its end.

**6.** The front-panel display identifies the missing ink cartridge.
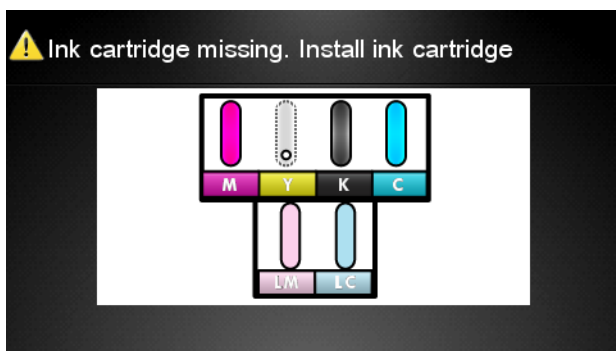
Insert an ink cartridge

1. Pick up the new ink cartridge and find the label that identifies the ink color. Hold the ink cartridge so that you can see the label at the top of the side that is facing you.

2. Check that the colored label above the empty slot in the printer matches the color of the label on the cartridge.

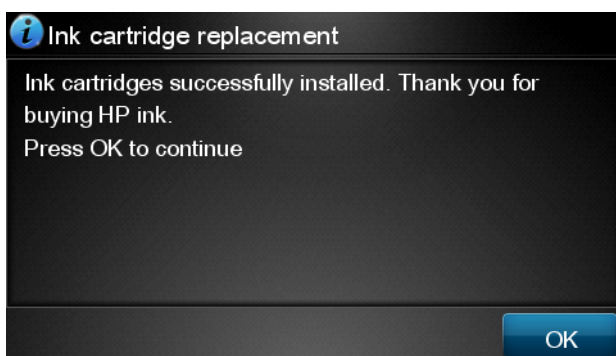**3.** Shake the cartridge vigorously for about 15 seconds.
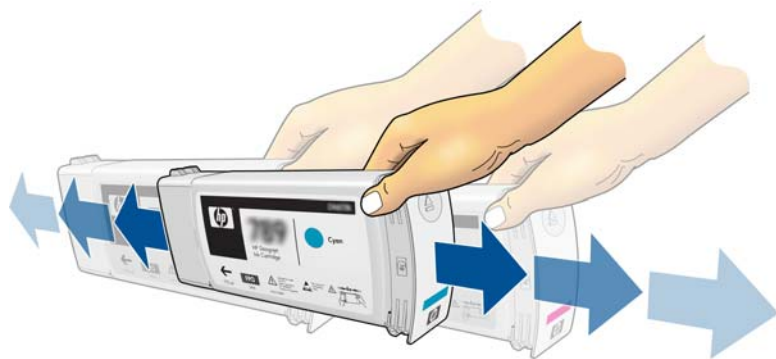
4. Insert the ink cartridge into the cartridge drawer.
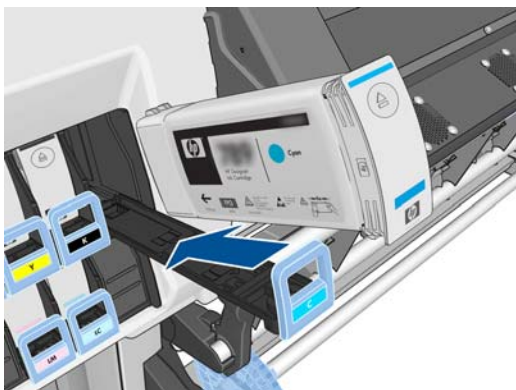
5. Slide the drawer and cartridge into the slot until they lock into position.

6. The front-panel display confirms that all cartridges have been correctly inserted.

Refilled and non-HP ink cartridges

HP recommends that you replace an empty cartridge with a new HP cartridge.

The use of refilled or non-HP ink cartridges has several disadvantages.

● If printer failure or damage is attributable to the use of a non-HP or refilled ink cartridge, HP will charge its standard time and materials charges to service the printer for the particular failure or damage.

● If failure or damage to printheads, ink cartridges, or other ink supplies is attributable to the use of non-HP, expired or refilled ink cartridge, HP is not responsible for the cost of replacement.

● Print quality may be impaired.

● The printer will be unable to estimate the ink level in the cartridge, and will report it as empty.

If you decide to use refilled or non-HP ink cartridges, you will need to follow these instructions to make the printer use a cartridge that it believes to be empty.

⚠ **CAUTION:** Running completely out of ink can damage the printheads. Damage attributable to printing with empty ink cartridges is not covered under the warranty. Forcing the printer to accept empty cartridges will empty the ink delivery system as well. Once emptied, ink must be used to refill the system and reprime the printhead when a new ink cartridge is installed.

1. Install the cartridge in the printer (see).

2. The front panel will complain that the cartridge is empty, and the cartridge removal process will start. Press ✖ to stop this automatic process.

3. On the front panel's home screen, press **Ink information** to display the following screen.
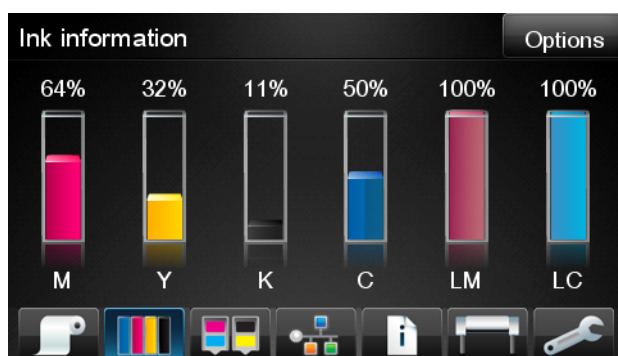
4. Press any cartridge to see more detailed information.
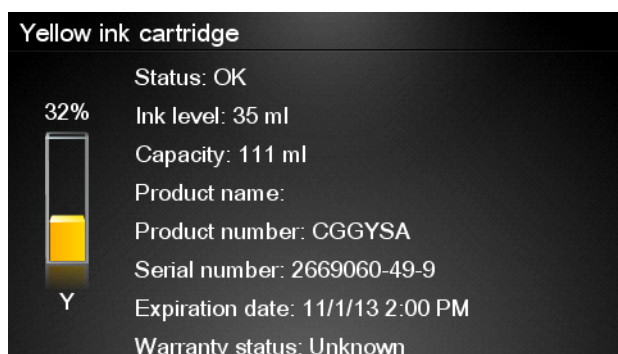
5. On the right-hand side of the front panel, press the following sequence: ?, ?, ✖, ✖. These icons are not illuminated; but, if you press them successfully, the front panel displays a series of warning messages. In response to each message, press **Cancel** to cancel the process, or **OK** to confirm that you wish to continue.

6. When you have pressed **OK** in response to all warning messages, the front panel gives the usual ink cartridge status display, but the cartridge is shown as empty with a warning sign.
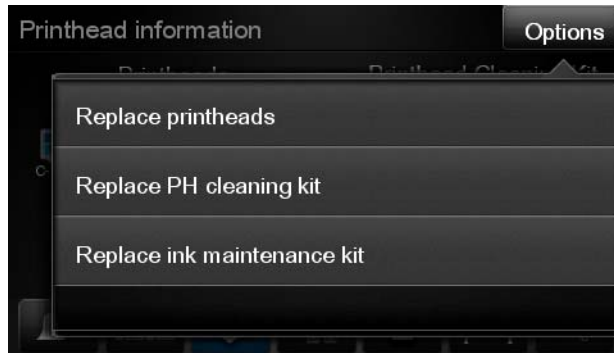
Replace the ink maintenance kit

The ink maintenance kit contains the ink funnel, the ink tube assembly, and the ink filter. The front panel prompts you when these components need to be replaced.

📝 **NOTE:** When you have removed the ink tube assembly, you cannot reuse it: you must install a new assembly.

1. Open the ink maintenance kit and remove the spare ink tube cap, which will be used to cover the end of the old ink tube.
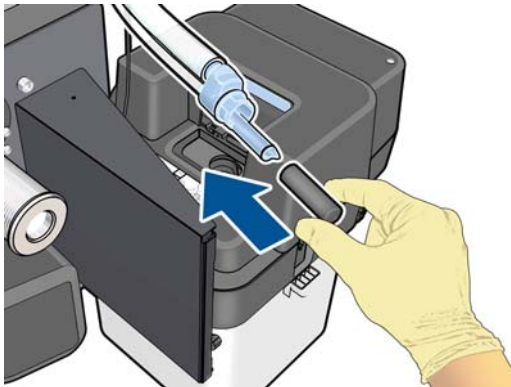
2. On the printer's front panel, press ![icon], then **Options** > **Replace ink maintenance kit**.
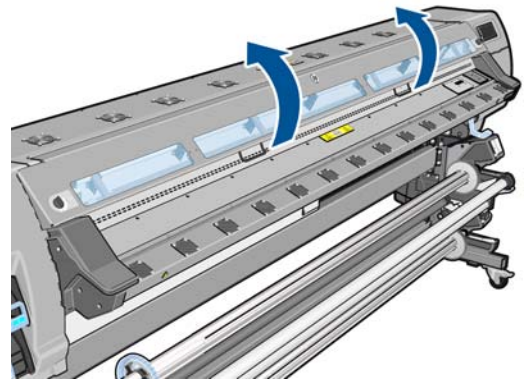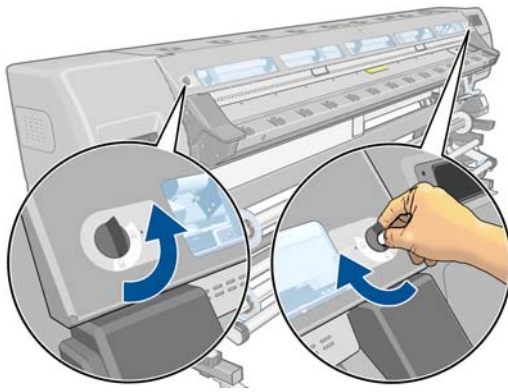

3. Pull the bottom of the ink tube assembly out of the printhead cleaning container.
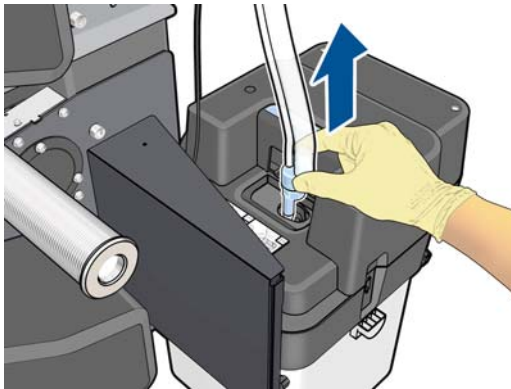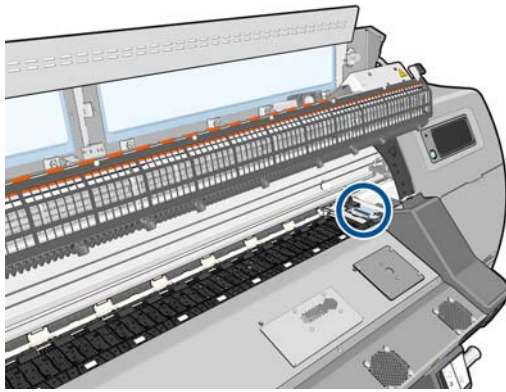

4. Cover the end of the old ink tube with the spare cap from the ink maintenance kit, to prevent ink from falling out of the tube.
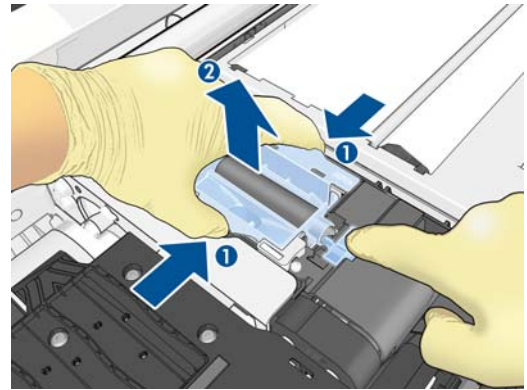

5. Unlock and open the window.
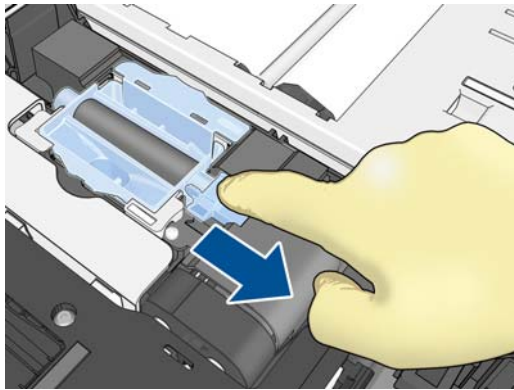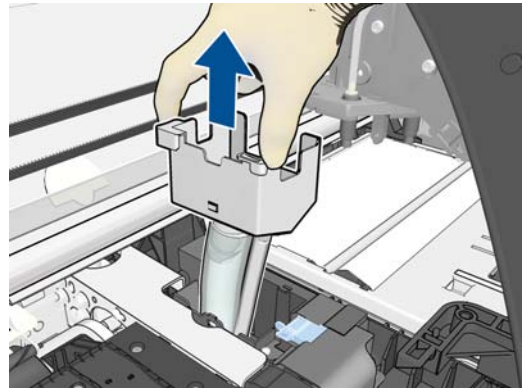
6. Locate the ink funnel.
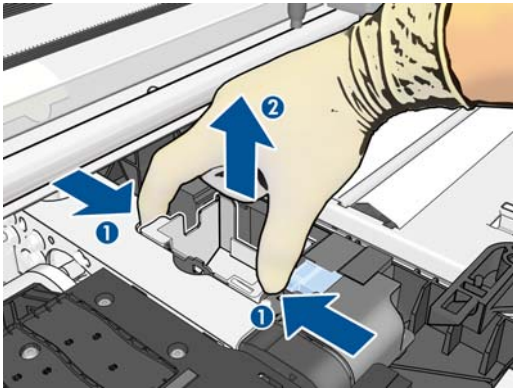

7. Pull the slider with one finger while removing the ink funnel with the other hand.

> **NOTE:** You are recommended to wear gloves.

8. Remove the ink tube assembly support and the ink tube assembly.

9. Insert the new ink tube assembly.
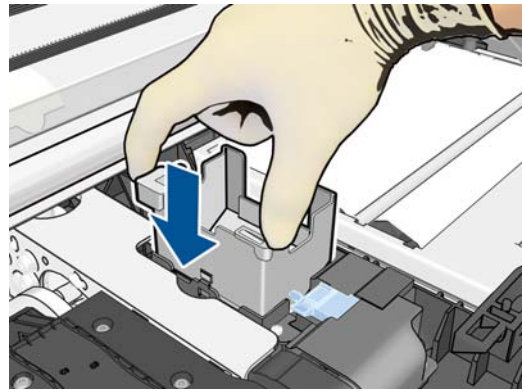
10. Pull the slider with one finger while inserting the new ink funnel with the other hand.
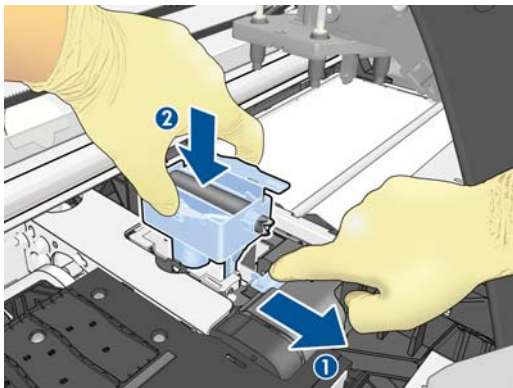
11. Press the ink funnel into place.

12. Remove the cap from the bottom of the ink tube assembly.

13. Insert the bottom of the ink tube assembly into the printhead cleaning container.
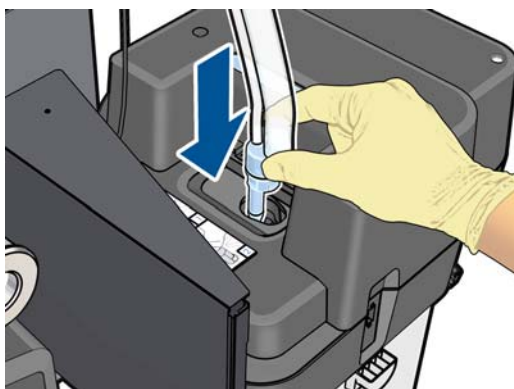
14. Open the ink filter cover.
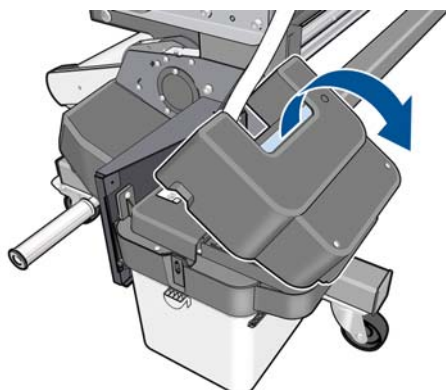
15. Remove the old ink filter and insert a new one.
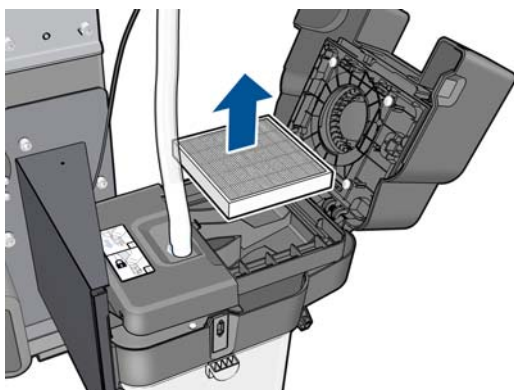
16. Close the ink filter cover.

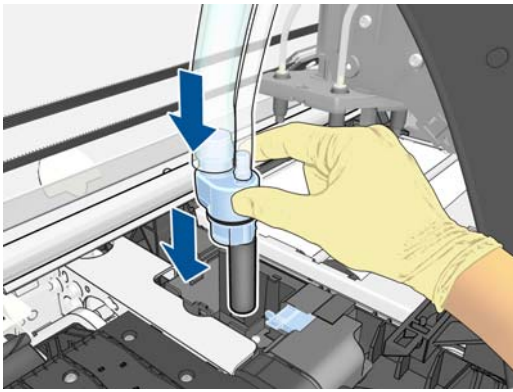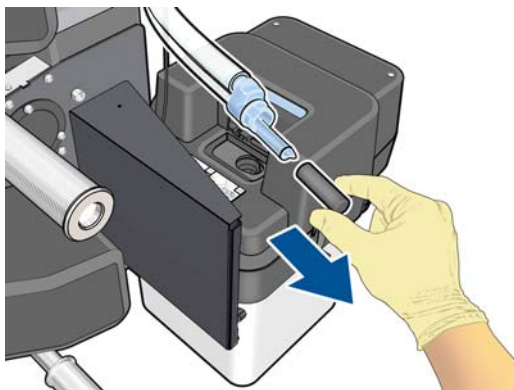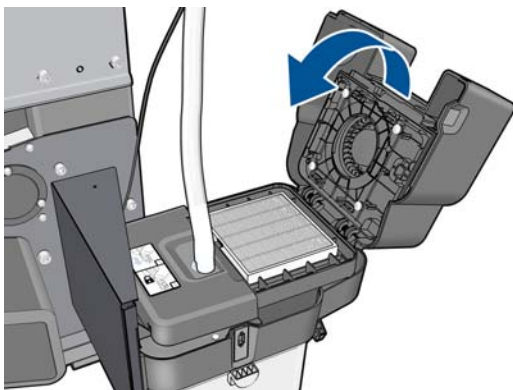**17.** Close and lock the window.
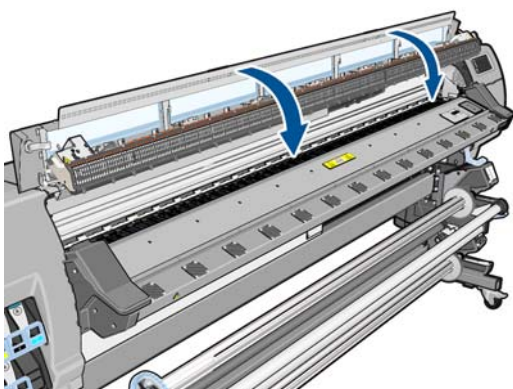
Replace a printhead

Remove a printhead

1. On the printer's front panel, press ![icon], then **Options** > **Replace printheads**.
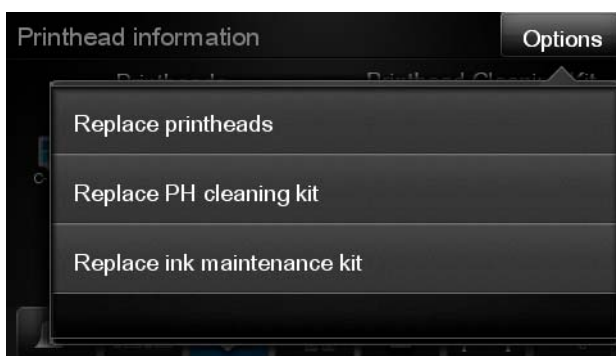
2. The carriage moves to the removal position.

⚠ **CAUTION:** If the carriage remains in the removal position for more than 3 minutes without inserting or removing any printheads, it will attempt to return back to its home position to the right.

3. When the carriage has stopped moving, the front panel prompts you to open the printer window. Unlock the window and open it.
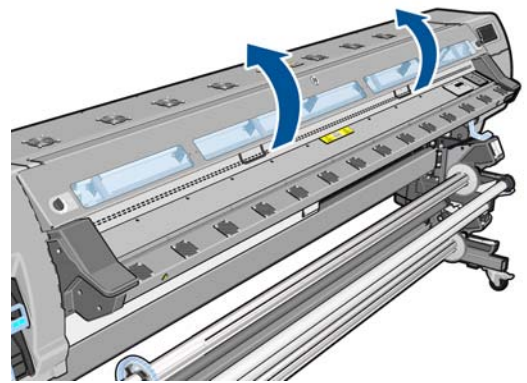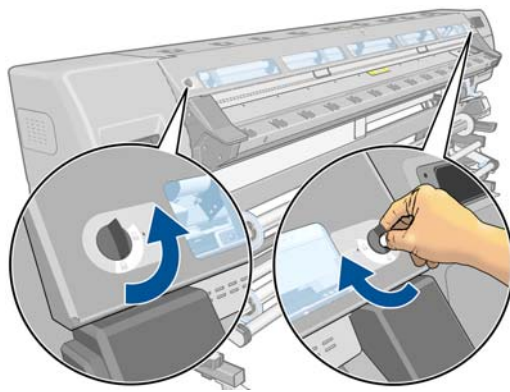
4. Locate the carriage on the right side of the printer.
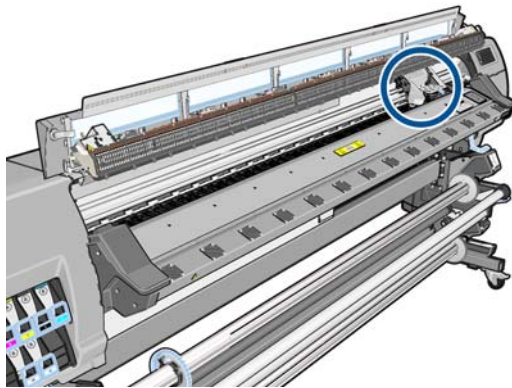
⚠ CAUTION: Avoid touching the printer's drying enclosure, which may be hot.

5. Pull up and release the latch on top of the carriage.
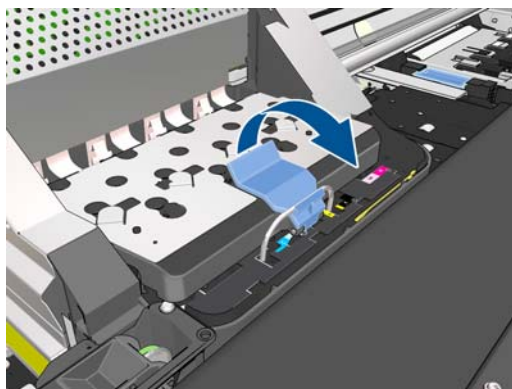
6. Lift up the cover. This provides access to the printheads.
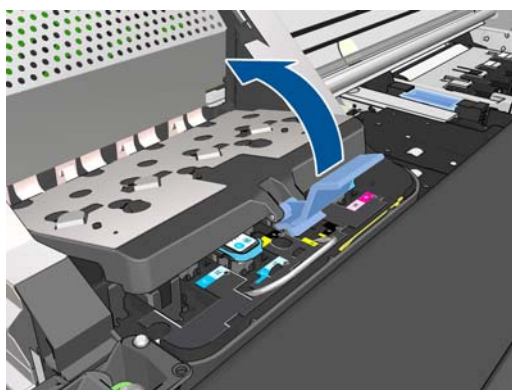
7. To remove a printhead, lift up the blue handle.
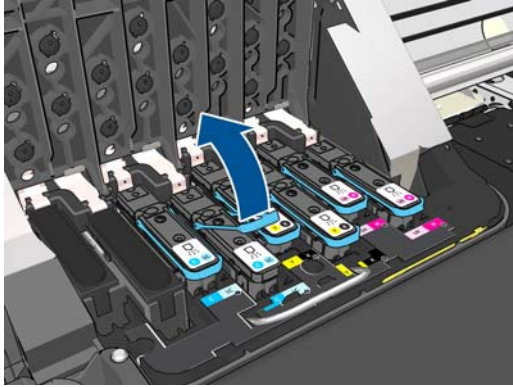
8. Using the blue handle, gently disengage the printhead.
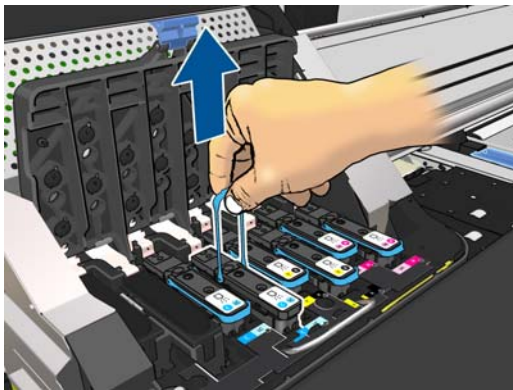
9. Gently pull the blue handle upward until the printhead is released from the carriage.

⚠ CAUTION: Do not pull abruptly. That action can damage the printhead.
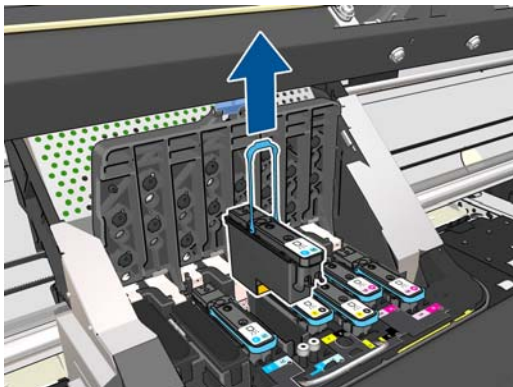
10. The front-panel display identifies the missing printhead.
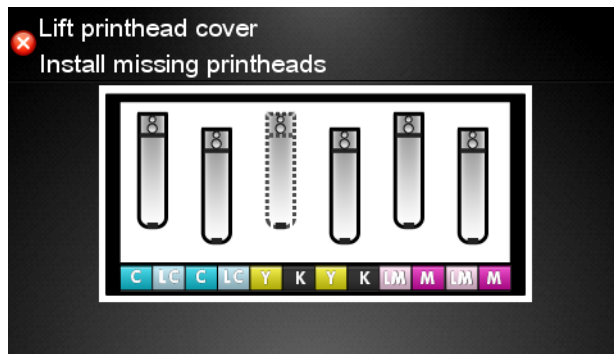
Insert a printhead

1. If the printhead is new, shake it vigorously before removing the protective caps. Hold the printhead upright (with the protective caps facing down) and shake the printhead vigorously in a smooth up and down motion for about 15 seconds.

NOTE: Be careful not to strike the printhead against anything while shaking it, because this could cause damage.
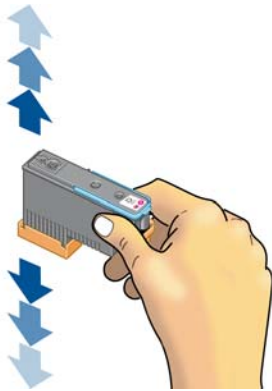
2. Remove the orange protective caps by pulling them down.
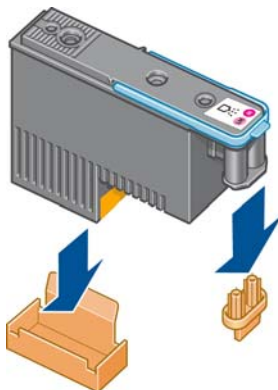
3. The printhead is designed to prevent you from accidentally inserting it into the wrong slot. Check that the colored label on the printhead matches the colored label of the carriage slot into which the printhead is to be inserted.

4. Insert the new printhead into its correct slot in the carriage.

   CAUTION: Insert the printhead slowly and vertically, straight down. It can be damaged if you insert it too quickly, or at an angle, or if you rotate it as you insert it.
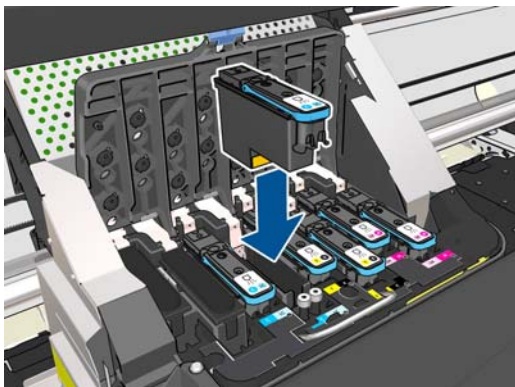
5. Push down as indicated by the arrow.
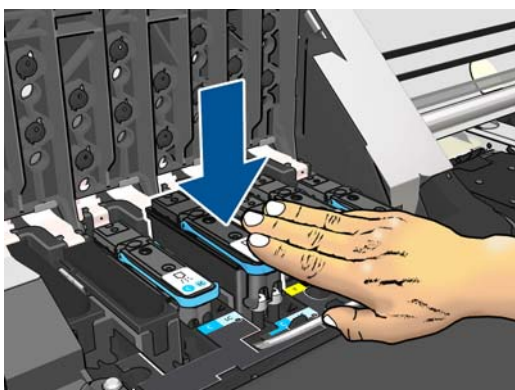
   CAUTION: You might feel some resistance when installing the new printhead, so you need to press it down firmly but smoothly. You should hear a beep and see confirmation on the front-panel display that the printhead has been inserted.

6. Insert all of the other printheads that need to be installed, and close the carriage cover.
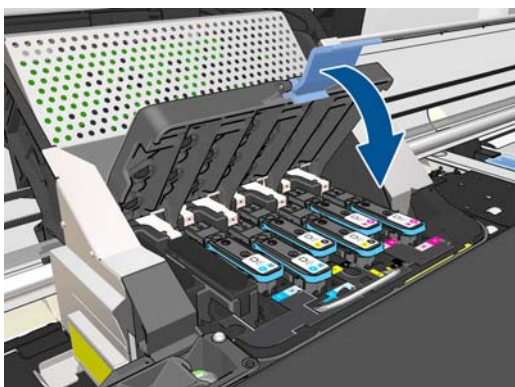
7. Make sure that the end of the latch catches the wire loop on the near side of the carriage.
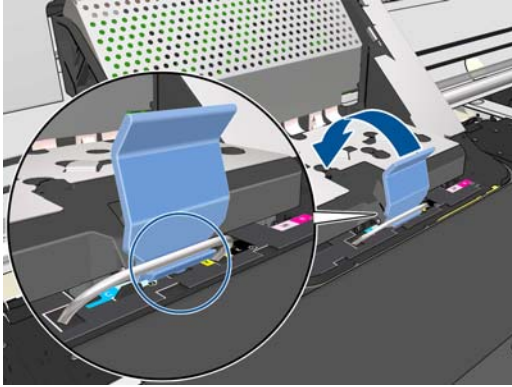
8. Lower the latch to rest on the carriage cover.
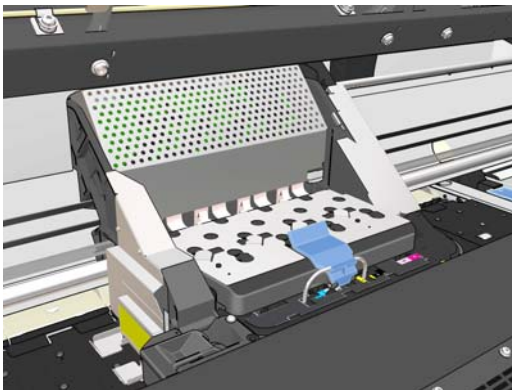
When all of the printheads have been inserted correctly and the printer has accepted them, the printer beeps.

NOTE: If the printer does not beep when you insert the printhead and the **Replace** message appears on the front-panel display, you might need to reinsert the printhead.

9. Close and lock the printer window.
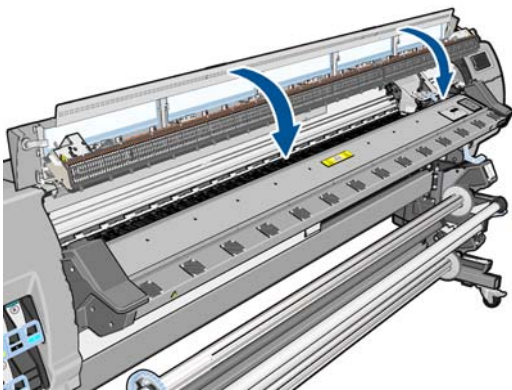
10. The front-panel display confirms that all of the printheads are correctly inserted. The printer starts checking and preparing the printheads. The default routine process, when all printheads are changed, takes up to 18 minutes. If the printer identifies a problem when preparing the printheads, the process takes longer, up to 30 minutes. For a single printhead insertion, the time varies between 10 and 20 minutes. After all printheads are checked and prepared, the printhead realignment procedure runs automatically if substrate is loaded.

Replace the printhead cleaning kit

The printhead cleaning kit contains the printhead cleaning cartridge, the ink funnel and the ink filter.

When the front panel prompts you to replace the printhead cleaning kit, you should replace first the printhead cleaning cartridge, then the ink funnel, then the printhead cleaning container and ink filter.

NOTE: The printhead cleaning container is not contained in the kit, but should be replaced at the same time. Therefore, make sure that you have a new printhead cleaning container ready, as well as a new printhead cleaning kit.

TIP: If you want to remove and inspect the printhead cleaning cartridge at any time, you can start the following procedure. If you put the old printhead cleaning cartridge back into the printer after inspecting it, the procedure ends at that point.

1. On the printer's front panel, press ![icon], then **Options** > **Replace PH cleaning kit**.
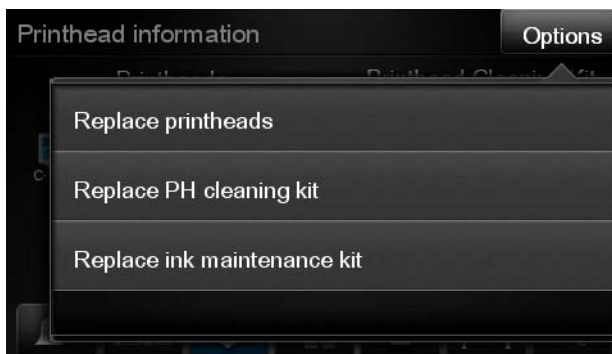
2. The printhead cleaning cartridge is located in a slot underneath the front panel, at the front of the printer. Open the door.
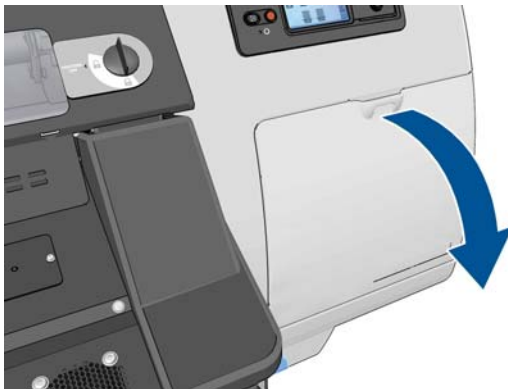
   Follow these precautions when removing a printhead cleaning cartridge:

   ● Be careful not to get ink on your hands. Ink may be on, around and inside the replaced printhead cleaning cartridge.

   ● Always handle and store the replaced printhead cleaning cartridge upright to avoid spilling any ink.

   WARNING! Make sure that the printer wheels are locked (the brake lever is pressed down) to prevent the printer from moving.

3. The printhead cleaning cartridge has a handle on the front. To remove the cartridge, press inward and upward as indicated by the arrow, until the cartridge is released.
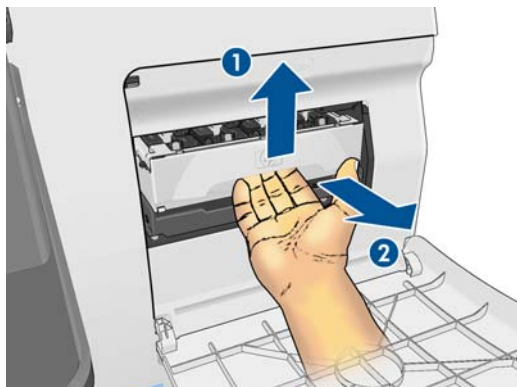
4. Lift up the printhead cleaning cartridge to remove it from the slot, and slide it out.

5. The plastic bag in which the new printhead cleaning cartridge comes can be used to dispose of the old printhead cleaning cartridge.

6. Remove the plastic cover from the new printhead cleaning cartridge.
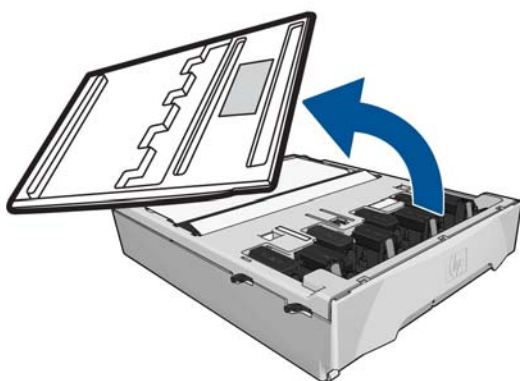
7. Insert the printhead cleaning cartridge into the slot, in the direction indicated by the arrow.

8. When the printhead cleaning cartridge has been pushed all the way in, press inwards and downwards as indicated, until it clicks into place.
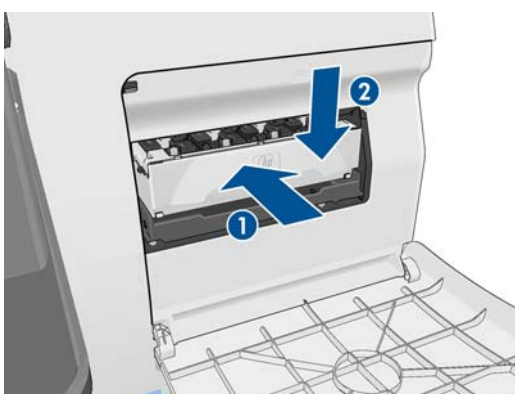
> **NOTE:** The front panel will not show the new printhead cleaning cartridge until the door is closed.

9. When you have inserted the printhead cleaning cartridge into the printer, close the door.
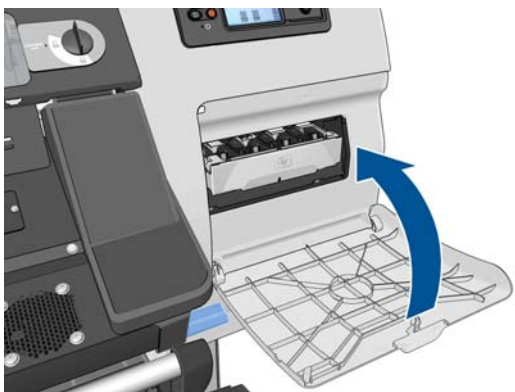
10. Unlock and open the window.
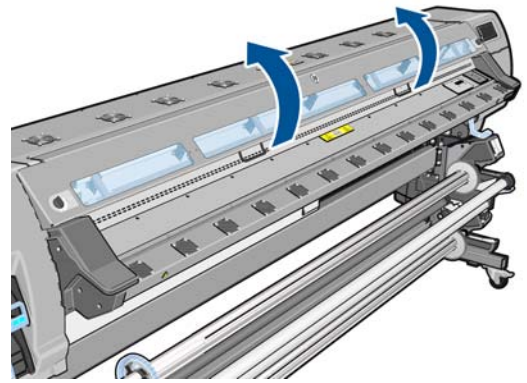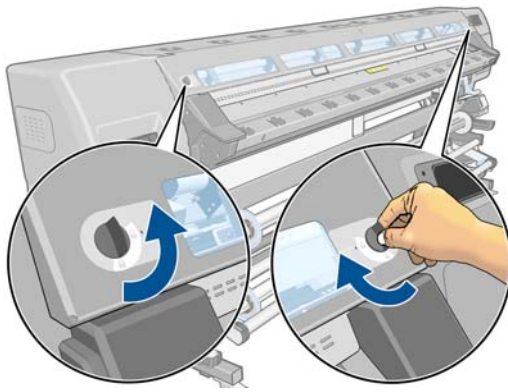
11. Locate the ink funnel.
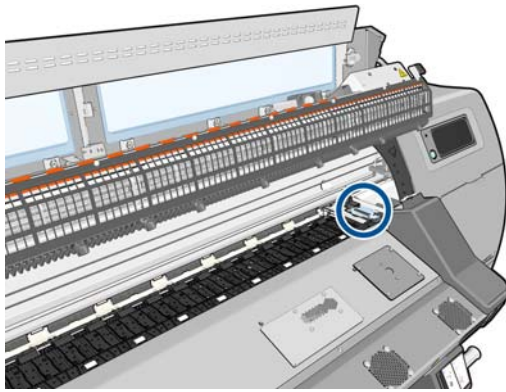
12. Pull the slider with one finger while removing the ink funnel with the other hand.

> **NOTE:** You are recommended to wear gloves.
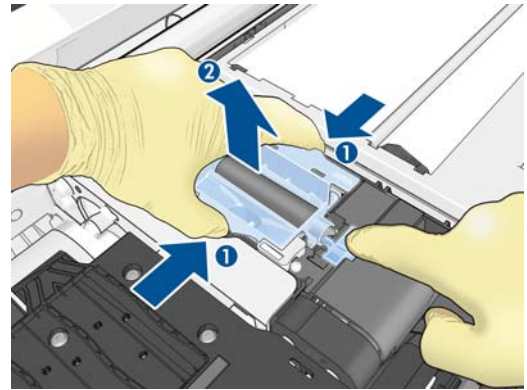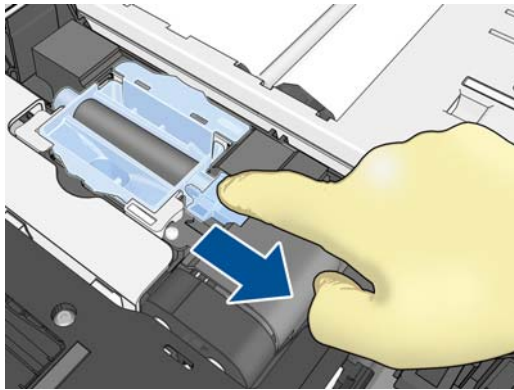
13. Pull the slider with one finger while inserting the new ink funnel with the other hand.
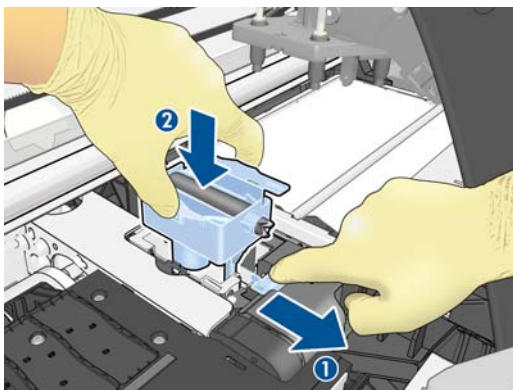
14. Press the ink funnel into place.

15. Close and lock the window.
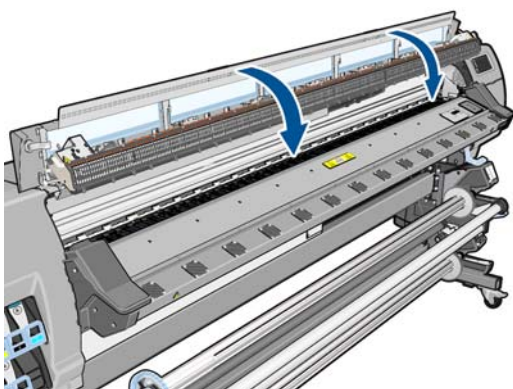
16. Open the ink filter cover.
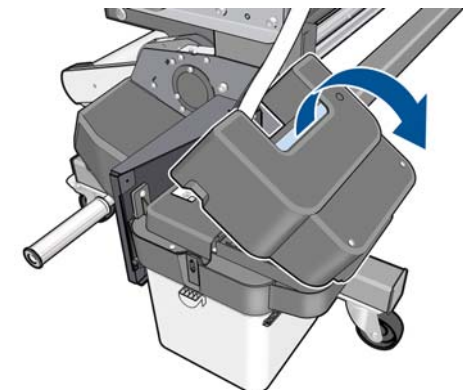
17. Remove the old ink filter and insert a new one.
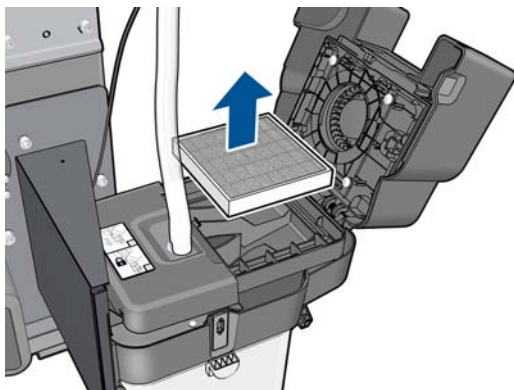
18. Close the ink filter cover.
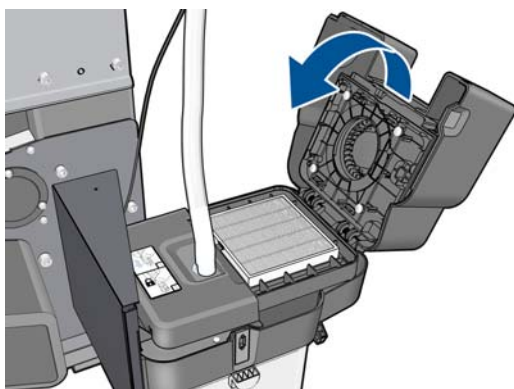
19. Remove the printhead cleaning container.
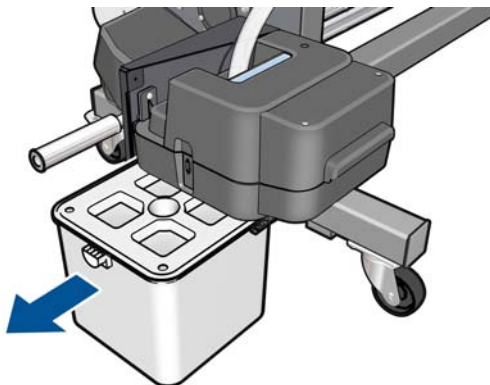
20. Insert the new printhead cleaning container.

📝 **NOTE:** Before it can resume printing, the printer needs all the ink cartridges, printheads and printhead cleaning cartridge to be installed, and the printer window and printhead cleaning cartridge door to be closed.

Service maintenance

During the life of your printer, components that are used constantly can wear out.

To avoid having these components degrade to the point that the printer breaks down, the printer keeps track of the number of cycles that the printer carriage makes across the axis of the printer, and also monitors the total quantity of ink used.

The printer uses these numbers to track the need for service maintenance, and displays one of the following messages on the front panel:

● **Service Maintenance Kit 1**

● **Service Maintenance Kit 2**

● **Service Maintenance Kit 3**

These messages mean that some components are nearing the end of their lives. You can continue printing for quite some time, depending on your use of the printer. However, HP strongly recommends that you call your service representative and arrange for a service maintenance visit. The service engineer can then replace the worn parts on-site, which will prolong the life of the printer.

The benefits of arranging a service engineer's visit when these messages appear on the front panel are two-fold:

● The printer components can be replaced at a time that is convenient for you, and so will not disturb your daily workflow.

● During a service maintenance visit, the service engineer replaces several parts at once. This eliminates the need for repeat visits.

13 Troubleshoot print-quality issues

General printing advice

Use the following approach when you have any print-quality problem:

- Make sure that the substrate type that you select on the front panel, and in your RIP software, is the same as the substrate type that is loaded in the printer. Make sure that the substrate type has been calibrated.

  ⚠ **CAUTION:** If you have the wrong substrate type selected, you could experience poor print quality and incorrect colors, and perhaps even damage to the printheads.

- Make that you are using the correct media preset for your substrate, or that you have followed the correct procedure to generate a new media preset (see Add a new substrate on page 55).

- Make sure that you are using appropriate print-quality settings in your RIP software.

- Make sure that you are using the correct ICC profile for your substrate and print-quality settings.

- Make sure that your environmental conditions (temperature, humidity) are in the recommended range. See Environmental specifications on page 157.

- Make sure that your ink cartridges have not passed their expiration dates. See Maintain the ink cartridges on page 100.

- Avoid touching the substrate while printing is in progress.

Use the printhead status plot

The printhead status plot consists of patterns that are designed to highlight printhead-reliability problems. It helps you to check the performance of the printheads that are currently installed in your printer, and to determine whether any printhead is experiencing clogging or other problems.

Print the printhead status plot

To print the printhead status plot:

1. Use the same substrate type that you were using when you detected a problem.

2. Check that the selected substrate type is the same as the substrate type that is loaded into the printer.

3. On the printer's front panel, press [ℹ], then [🔧], then **Ink** > **Image-quality maintenance** > **Clean printheads** > **Print test plot**.

Interpret the printhead status plot

The print consists of small dashes, one for each nozzle on each printhead.
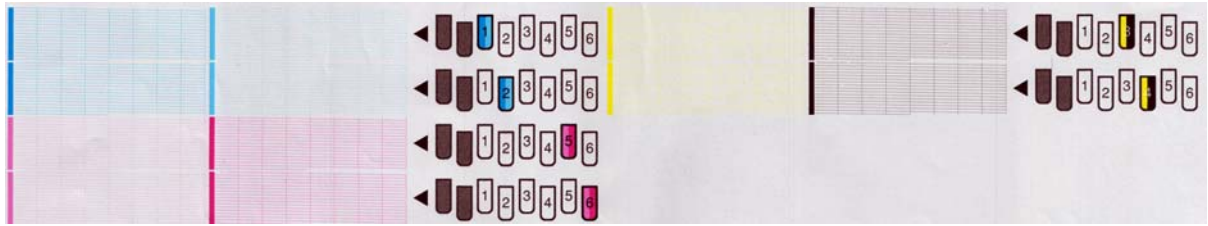
For each individual colored pattern, make sure that most of the dashes are present.

Corrective action

1. Clean any faulty printheads. See Clean the printheads on page 142. Then reprint the printhead status plot to see whether the problem has been solved.

2. If the problem persists, clean the printheads again, and reprint the printhead status plot to see whether the problem has been solved.

3. If the problem continues to persist, replace any persistently faulty printheads. See Replace a printhead on page 110.

What to do if problems persist

If you still experience print-quality problems after applying the advice in this chapter, here are some additional tips to consider:

- Try selecting a higher print-quality option in your RIP software, either by increasing the number of passes or by reducing the carriage speed.

- Check that your printer firmware is up to date. See Firmware update on page 87.

- Check that you have the correct settings in your software program.

- Call your service representative. See When you need help on page 153.

Graininess

If you see this kind of problem:

- Ensure that the vertical correction option is disabled in the RIP and in the front panel. At the front panel, press , then , then **Ink** > **Image-quality maintenance** > **Vertical correction** (if this option is available).

- The printheads may be misaligned. This is likely if you have not aligned the printheads for a long time, or if there has been a substrate jam. Align the printheads if necessary (see Align the printheads on page 89). You can check whether it is necessary by using the printhead status plot (see Use the printhead status plot on page 123).

- The substrate-advance sensor may be dirty. This is likely if you have been printing on a porous substrate without cleaning the platen afterwards (see Clean the platen on page 97).

- If you are printing with eight or more passes, the substrate advance may need adjustment. See Adjust the substrate advance on page 126.

- Use a higher number of passes: you will probably see less grain with ten or more passes.

- If graininess is more visible in dark or saturated colors, or at the left and right edges of the print, there may be a problem of ink coalescence. Try lowering the ink quantity, or modify the inter-pass drying time (in the RIP or front panel) to allow better drying on consecutive passes.

If the problem persists, call your service representative. See When you need help on page 153.

Horizontal banding

Try the following remedies if your printed image suffers from added horizontal lines as shown (the color may vary).

- If bands affect mostly dark or saturated colors, or only area fills near the edges of the substrate, the cause could be insufficient drying of the ink, or an inaccurate color profile. Try the following suggestions.

  ◦ Reduce the ink quantity.

  ◦ Modify the inter-pass drying time (in the RIP or front panel) to allow better drying on consecutive passes.

  ◦ Increase the number of passes.

  ◦ Modify your media preset as suggested in Color reproduction tricks on page 67.

- If bands affect all colors across the width of the printed image, the cause is probably a substrate advance problem. Use the front panel to adjust the substrate advance on the fly (see Substrate advance adjustment on the fly on page 126). If you have dark bands, increase the substrate advance; if you have light bands, decrease it. When you find the right adjustment, store the value in the RIP for future prints on the same substrate.

  Another cause could be a fiber attached to one of the printheads. Turn off the printer and allow it to cool down, then remove the printheads one at a time and remove any fibers that you see attached to them.

- If bands affect only some colors, the cause could be a defective printhead.

  ◦ Print the printhead status plot (see Use the printhead status plot on page 123). If necessary, clean the printheads (see Clean (recover) the printheads on page 99).

  ◦ Clean the printheads again.

- ◦ Align the printheads (see [Align the printheads on page 89](#)). If necessary, align them manually.

- ◦ Print the printhead status plot again. Identify the printhead with the greatest number of blocked nozzles, and replace it.

- ◦ If bands appear and disappear intermittently, go to the front panel and press [info icon], then [wrench icon], then **Ink** > **Image-quality maintenance** > **Extra PH cleaning** > **On**. Remember to turn this option off when you no longer need it, because it shortens the life of the printhead cleaning kit.

● If bands affect most of the colors, the printheads could be misaligned. This is likely if you have not aligned the printheads for a long time, or if there has been a substrate jam. Align the printheads if necessary (see [Align the printheads on page 89](#)). You can check whether it is necessary by using the printhead status plot (see [Use the printhead status plot on page 123](#)).

● If banding occurs mostly in black areas, create a new color profile using pure black and not a mixture of other colors. See your RIP documentation.

If the problem persists, call your service representative (see [HP Customer Care Centers on page 153](#)).

Adjust the substrate advance

The substrate advance sensor measures the advance of the substrate and compensates for irregularities at every pass of the printheads. However, to fine-tune the quality of your print, you may need to calibrate the rate at which the substrate advances. The substrate advance determines the placement of dots on the substrate. If the substrate is not advanced correctly, light or dark bands appear in the printed image and the grain in the print may increase.

You can modify the substrate advance with the Substrate Advance parameter in the RIP's substrate preset.

1. On the front panel, press [info icon], then [wrench icon], then **Ink** > **Image-quality maintenance** > **Substrate advance calib** > **Print adjustment plot**. The printer prints a substrate-advance adjustment image.
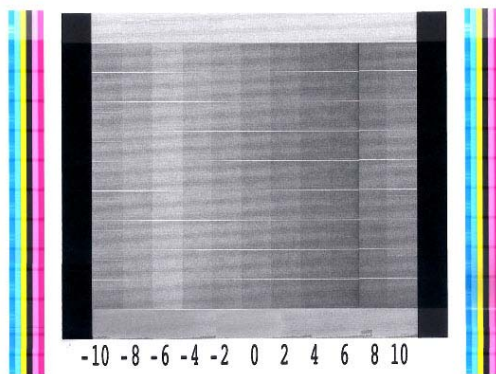
2. The calibration image consists of several columns with a number at the bottom of each one. Locate the lightest of the columns and enter its number into the RIP's Substrate Advance parameter for the current substrate preset. The value chosen in this example should be "−6".

Substrate advance adjustment on the fly

If you are using no more than six passes, you can fine-tune the substrate advance while printing: press [icon], then **Adjustments** > **Adjust substrate advance**. Select a value of change from −10 mm/m to +10 mm/m (or mils/inch). To correct light banding, decrease the value. To correct dark banding, increase the value.

If you are using eight passes or more, a wrong advance adjustment will not produce banding but graininess, which is harder to assess visually. Therefore, in this case you are recommended to use only the adjustment plot.

When you have chosen a value and pressed OK, the rest of your job will be printed with that value, but it will be reset to zero at the end of the job. Add the value found to the Substrate Advance value in the RIP preset to print all future jobs with the new setting.

Vertical banding

There are several different kinds of vertical banding that may be seen.

- Wide vertical bands visible by darkness or graininess, typically seen on vinyl and banner substrates in medium-density area fills such as grays, violets and greens

  ◦ Align the printheads. See Align the printheads on page 89.

  ◦ Try the automatic correction for vertical banding provided by the RIP. Depending on your firmware version, this option may also be provided by the front panel: press [ ], then [ ], then **Ink > Image-quality maintenance > Vertical correction** (if this option is available).

  > **NOTE:** Remember to disable the vertical banding correction when you no longer need it, because it may increase grain.

  ◦ Decrease the base drying temperature in steps of 5°C. This is likely to reduce vertical banding in light-to-medium-density area fills, but not if you are printing high-density area fills.

  > **NOTE:** You may change the drying temperature while printing at any time if you are trying to print with different ink densities.

  > **NOTE:** Slight differential banding at the sides and/or color differences may appear at the very edges of the print. In this case, try to increase the inter-pass drying time (in the RIP or front panel) to allow better drying on consecutive passes, or modify the side margins of the print if possible.

  ◦ Increase the roll back tension in steps of 5 N/m.

  ◦ Reduce the minimum drying power in steps of 0.2 kW if you are printing very-light-density area fills.

  ◦ Reduce the vacuum level in steps of 5 mmH$_2$O when printing on vinyl. Do not exceed the lower limit of 10 mmH$_2$O to avoid crashes and/or smears.

  ◦ Consider using the take-up reel, to give the printer better control of the substrate.

  ◦ This kind of banding is less visible when the printer is stable at high temperature (after more than half an hour of continuous printing). You can help to avoid visible banding by modifying the printing queue so that vulnerable or important prints are printed later; or by pre-warming the printer (see Change the warming duration on page 16).

- Thin vertical bands visible by darkness, typically seen in the first 150–200 mm of the print on vinyl and banner glossy substrates in high-density area fills or in backlit applications

  ◦ Reduce the ink quantity if possible.

  ◦ Modify the inter-pass drying time (in the RIP or front panel) to allow better drying on consecutive passes.

  ◦ Disable the cutter.

  ◦ Increase the number of passes.

- If applicable, tell the RIP to group jobs together, so that printer temperatures remain more stable between jobs.

- Modify your media preset as suggested in [Color reproduction tricks on page 67](#).

- Irregular or isolated vertical bands

  - Increase the vacuum level in steps of 10 mmH$_2$O. Do not exceed the following limits: 20 mmH$_2$O for banners, 35 mmH$_2$O for vinyl, and 50 mmH$_2$O for other substrate families.

  - In backlit applications, increase the number of passes to 20 or more, and change the drying temperature up and down in steps of 5°C.

  - If the banding appears only at the beginning of the print, disable the cutter and advance the substrate manually about 100–150 mm before the first print.

The print is deformed into a curved shape

This may occur as a result of substrate bow deformation. See [The substrate has bow deformation on page 138](#).

Misaligned colors
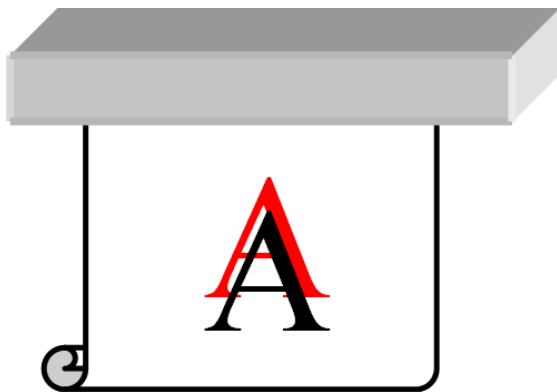
If the colors are misaligned in any direction, the printheads may be misaligned. This is likely if you have not aligned the printheads for a long time, or if there has been a substrate jam. Align the printheads if necessary (see [Align the printheads on page 89](#)). You can check whether it is necessary by using the printhead status plot (see [Use the printhead status plot on page 123](#)).

Color intensity varies

If some printhead nozzles are in use while others in the same printhead are not, water evaporates slowly from the ink in the unused nozzles, making the color more intense. Thus, in such cases you may notice variations in color intensity in areas where the color of the image should be constant.

If you notice such a problem, there are various possible solutions.

● At the front panel, press ![info icon], then ![wrench icon], then **Ink** > **Image-quality maintenance** > **Color variation correction** > **On**. This correction will then remain enabled until you disable it.

● If you notice the variation in intensity near one side of the print, try rotating the image by 180 degrees before printing. This may solve the problem in some cases, as all the nozzles are refreshed whenever they enter the service station between passes.

● Use your RIP to add lateral color bars on the side of the plot that is close to the ink supplies. The color bars are designed to exercise all the printhead nozzles, to prevent the problem from occurring.

> **NOTE:** Not all RIPs provide this option.

● Add lateral color bars to the image, manually, before printing. In this case, you can either use the standard colors, or decide to include a particular color in which you have noticed the problem. The recommended width of each color bar is 3 mm.

Lack of sharpness

If text, lines or solid areas are rough or blurred, the printheads may be misaligned. This is likely if you have not aligned the printheads for a long time, or if there has been a substrate jam. Align the printheads if necessary (see Align the printheads on page 89). You can check whether it is necessary by using the printhead status plot (see Use the printhead status plot on page 123).

Black areas look hazy

If black areas look hazy or not sufficiently black, try these suggestions.

- Increase the number of passes.

- Laminate the print.

- See .

Ink smears

Ink smears may be seen on the print for the following reasons.

- The substrate is skewed. Do not ignore the warning message that appears during the loading process if there is significant skew.

- The substrate is not flat in the print zone. Try the following possible solutions.

  ◦ Increase the vacuum level in steps of 10 mmH$_2$O.

  ◦ Reduce the curing temperature. You will probably need to increase the number of passes in order to achieve adequate curing.

  ◦ Check whether there are fibers on the printheads.

If the problem appears only at the sides of the print, because the edges are uneven or the substrate is curled upward at the sides, consider using the edge holders (see).

If the problem appears only at the beginning of the print, try the following suggestions.

- Disable the automatic cutter.

- Go to the front panel and press [info icon], then [wrench icon], then **Substrate** > **Substrate handling options** > **Extra bottom margin**. Set the margin to 100 mm. If that is not enough, try higher values. This extra margin will apply only to jobs that start printing when the printer is idle and when the cutter is disabled.

- Increase the vacuum level in steps of 10 mmH$_2$O. Do not exceed the following limits: 20 mmH$_2$O for banners, 35 mmH$_2$O for vinyl, and 50 mmH$_2$O for other substrate families.

- Decrease the warm-up drying temperature in steps of 5°C.

- Decrease the warm-up curing temperature in steps of 5°C.

- Increase the number of passes.

- Make sure that the substrate is stored in the same room in which the printer is located.

Subtle stains or uneven appearance

Subtle color differences may be seen on some substrates if they are stored partially covered after printing. In the period immediately after printing, such substrates should be stored either totally covered or totally uncovered. It may be advisable to avoid the prolonged contact of two printed faces. This problem tends to disappear if the substrate is left uncovered for some time.

Alternatively, some individual rolls of substrate may have a defective coating. The solution in this case is to use another roll.

The ink smudges when touched, or looks oily

There are various different circumstances in which these symptoms can be seen.

- When there is a big transition from light to dark colors across the length or width of the substrate

Increase the minimum drying power.

> **NOTE:** This solution is specific to this problem, and should not be used in other cases, when it could cause further problems.

- When the symptoms can be seen only at the start of the first print after the printer has been idle for some time (especially when the start of the print uses a lot of ink)

  Increase the warm-up drying temperature offset and the warm-up curing temperature offset. If necessary, increase the stable drying and curing temperatures, or slightly reduce the ink limits.

- When the symptoms can be seen only at the left and right sides of the print

  Increase the drying and curing temperatures, decrease the overall ink quantity, increase the number of passes and/or modify the inter-pass drying time (in the RIP or front panel) to allow better drying on consecutive passes.

- When the symptoms can be seen only in certain parts of the print that use a lot of ink

  Increase the drying and curing temperatures, decrease the overall ink quantity, increase the number of passes and/or modify the inter-pass drying time (in the RIP or front panel) to allow better drying on consecutive passes.

- When the symptoms can be seen only in the center of the print

  Check that all fans are working correctly.

- After reducing the number of passes

  Increase the drying and curing temperatures and/or decrease the overall ink quantity.

- When the oily finish appears minutes or hours after printing

  Store the print face-up and uncovered; the effect normally disappears after a while.

> **NOTE:** If you decrease the overall ink quantity, you may notice less color saturation.

The dimensions of the print are wrong

As the substrate is heated during the drying and curing processes, some substrates will shrink (and some may expand) after the image has been printed. This may be inconvenient if the print has to be framed or if several prints are to be to be tiled one next to the other.

See .

Tiling issues

The most common problems when printing tiles are as follows.

- Color degradation within individual tiles

  In many cases, individual tiles are long and contain very large areas of solid colors. This combination (long areas of saturated solid colors) may lead to a degradation of printhead performance, which can then cause degradation of the color inside the tile. To solve this problem, go to the front panel and press ![info icon], then ![wrench icon], then **Ink** > **Image-quality maintenance** > **Extra PH cleaning** > **On**. Remember to turn this option off when you no longer need it, because it shortens the life of the printhead cleaning kit.

- Color variation tile-to-tile

  In some cases, contiguous tiles with the same background solid color may show differences in color between the right side of the first tile and the left side of the second tile. This is a common issue of

inkjet printers (both thermal inkjet and piezo inkjet), where there are slight color variations as the swath advances.

Here are some recommendations to improve color consistency side-to-side and tile-to-tile.

- ◦ Move the spindle's right-hand stop to its inner position for substrates less than 2.54 m (100 in) wide.

- ◦ Use the RIP to add a short inter-pass delay (0.5 to 1 s), reducing dry-time differences between the sides and the center of the print.

- ◦ Use the faster carriage speed (1.5 m/s (60 in/s)) to complement the effect of the inter-pass delay, while also compensating for the loss of throughput due to the delays.

- ◦ Color bars at the side of the print can enhance the edge-to-edge color accuracy. These can be set from the RIP.

- ◦ If you are using a unidirectional print mode, try changing to bidirectional printing.

Since the biggest color differences are between the left edge and the right edge, the effect may sometimes be seen when putting two tiles together. This issue can easily be overcome by inverting alternate tiles, which has the effect of placing the right side of the first tile next to the right side of the second tile and the left side of the second tile next to the left side of the third, so all contiguous areas have been printed in the same point of the swath and, hence, have the same color. This is a feature that all RIPs have available.

- Dimensional variations from tile to tile

  Some specific banner substrates may not have uniform dimensional stability when printing very long tiles. The result is that the length of the tile may be different between the left and the right side (for instance, a 9-meter-long tile may be about 1 cm longer on the right than on the left side). While this is not noticeable with individual plots, it affects the alignment between panels in tiling applications. Substrate types that show this behavior tend to show it constantly along the roll. So, when present, this issue can easily be overcome by inverting alternate tiles as described above.

14 Troubleshoot substrate issues

The substrate cannot be loaded successfully

Here are some suggestions to try if you cannot load the substrate successfully.

- Reread the loading instructions, and make sure that you are following them. See Handle the substrate on page 21.

- When loading a textile substrate, remember to use the loading accessory, and select **Load with accessory** in the front panel.
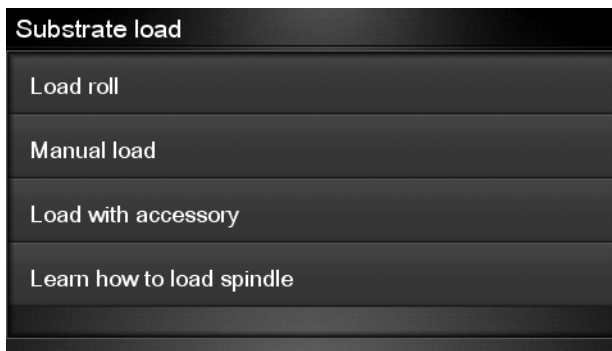
- If automatic loading is unsuccessful, try manual loading instead.

- The substrate might be loaded at an angle (skewed or mislocated). Make sure that the right edge of the substrate is aligned with the roll on the input spindle.

- The substrate might be crumpled or warped, or have irregular edges.

- If the substrate jams in the substrate path to the platen, the leading edge of the substrate might not be straight or clean. Remove the initial 2 cm (1 in) of substrate from the roll and try again. This might be necessary even with a new roll of substrate.

- Make sure that the spindle is correctly inserted.

- Make sure that the substrate is correctly loaded on the spindle, and that it loads over the roll towards you.

- Make sure that the substrate is wound tightly.

- If the substrate is curled, and you see a **Clean OMAS or disable it at the RIP** alert, advance the substrate until the whole print zone is covered, then go to the front panel and press [icon], then [icon], then **Ink > Image-quality maintenance** > **OMAS calibration**.

The substrate is mispositioned
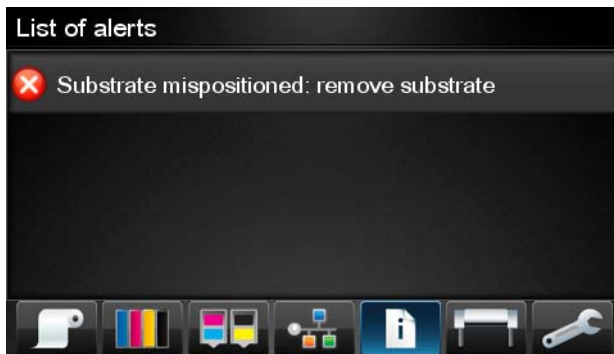
If you see the above display on the front panel, proceed as follows.

1. Lift the substrate lever.

2. Manually reposition the substrate on the platen.

3. Lower the substrate lever.

4. Repeat the above steps until the front panel displays the **Ready** message.

The substrate has jammed

When a jam occurs, the **Possible substrate jam** message usually appears in the front panel, with one of several error codes (see Front-panel error messages on page 149).
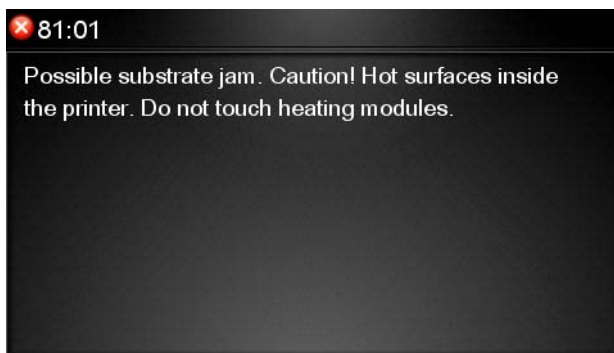
If you are trying to load a very thin or very thick substrate, or a textile, remember to follow the special procedure for loading such substrates. See The loading accessory on page 45.

Check the substrate path

- This problem can occur when a roll has finished and the end of the roll is stuck to the cardboard core. If this has happened, cut the end of the roll away from the core. Then feed the substrate through the printer, and load a new roll.

- Otherwise, follow the procedure described under Check the printhead path on page 134.

Check the printhead path

1. Turn off the printer at the front panel, then also switch off the power switch at the rear.
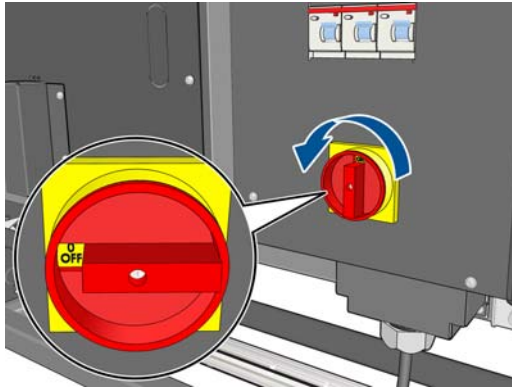
2. Unlock and open the printer window.
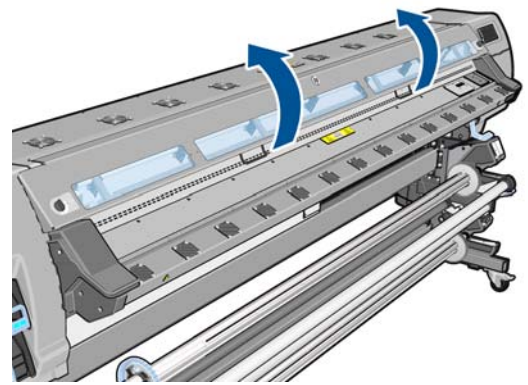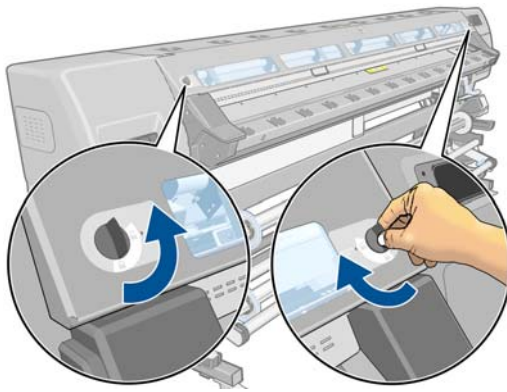
3. Cut the substrate where it enters the printer, and rewind the input roll.

4. Wait for the printer to cool down to room temperature.

5. Try to move the printhead carriage out of the way.
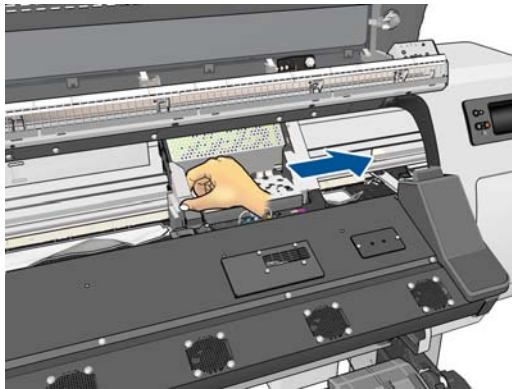
6. Lift the substrate-adjustment lever as far up as it will go.
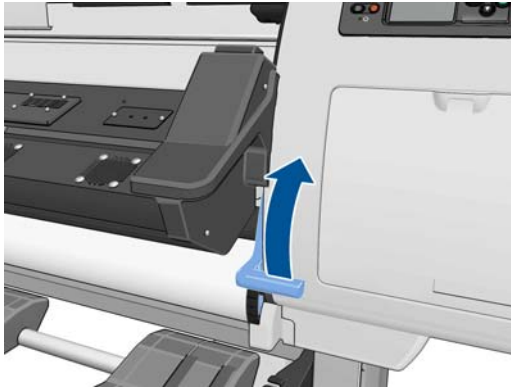
7. Carefully remove as much as possible of the jammed substrate from the top of the printer. Cut the substrate if necessary.
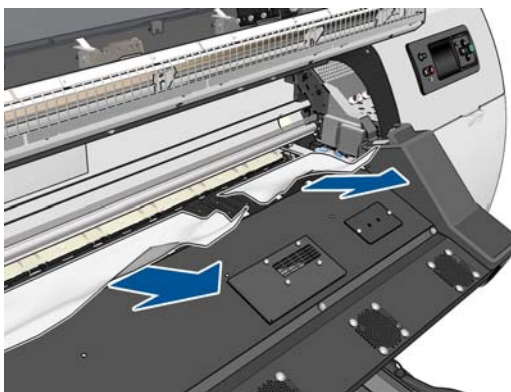
⚠ **CAUTION:** Try to avoid pulling the substrate out from the input path, because this reverses the normal direction of movement, and could damage printer parts.

8. Lower the substrate-adjustment lever.

9. Make sure that there are no pieces of substrate left in the printer. In particular, check in and under the curing module, and in the substrate path.

10. Close and lock the window.

11. Turn on the printer.

12. Reload the roll.

13. If some substrate continues to cause an obstruction within the printer, it can often be cleared by loading a rigid substrate type into the printer.

14. If you find that you have print-quality problems after a jam, try realigning the printheads. See Align the printheads on page 89.

Avoiding substrate jams

Substrate jams may be caused by loading the substrate with too much skew: do not ignore the warning message that appears during the loading process in this case.

They may also be caused by not enough vacuum suction in the printing zone. If you decide to increase the suction, do not exceed the following limits: 20 mmH_2O for banners, 35 mmH_2O for vinyl, and 50 mmH_2O for other substrate families.

If you experience jams only at the beginning of a print, try the following suggestions.

- Disable the automatic cutter.

- Go to the front panel and press ▮ , then 🔧 , then **Substrate** > **Substrate handling options** > **Extra bottom margin**. Set the margin to 100 mm. If that is not enough, try higher values. This extra margin will apply only to jobs that start printing when the printer is idle and when the cutter is disabled.

- Increase the vacuum level in steps of 10 mmH$_2$O. Do not exceed the following limits: 20 mmH$_2$O for banners, 35 mmH$_2$O for vinyl, and 50 mmH$_2$O for other substrate families.

- Decrease the warm-up drying temperature in steps of 5°C.

- Decrease the warm-up curing temperature in steps of 5°C.

- Increase the number of passes.

- Make sure that the substrate is stored in the same room in which the printer is located.

The substrate is deformed or wrinkled

If your substrate is deformed or wrinkled by the drying and curing process, change the temperature settings before printing the next job, and advance the substrate, using the **Move substrate** option in the front panel's **Substrate** menu, so that the next job will be printed on undamaged substrate.

If the problem appears only at the beginning of the print, try the following suggestions.

- Disable the automatic cutter.

- Go to the front panel and press ▮ , then 🔧 , then **Substrate** > **Substrate handling options** > **Extra bottom margin**. Set the margin to 100 mm. If that is not enough, try higher values. This extra margin will apply only to jobs that start printing when the printer is idle and when the cutter is disabled.

- Increase the vacuum level in steps of 10 mmH$_2$O. Do not exceed the following limits: 20 mmH$_2$O for banners, 35 mmH$_2$O for vinyl, and 50 mmH$_2$O for other substrate families.

- Decrease the warm-up drying temperature in steps of 5°C.

- Decrease the warm-up curing temperature in steps of 5°C.

- Increase the number of passes.

- Make sure that the substrate is stored in the same room in which the printer is located.

The substrate has shrunk or expanded

During the printing process, some substrates may shrink, while others may expand. If this happens, the dimensions of the print will not be correct.

As a general rule, you can expect the following percentages of shrinkage:

- Photorealistic: less than 0.4%

- Paper-Solvent, Paper-Aqueous: less than 0.5%

- Self-Adhesive: less than 1.2%

- Banner: less than 3% shrinkage (if you disable the substrate-advance sensor, less than 7%)

The framing problem may be solved by printing a sample and adjusting the size of the image in the RIP. You may reuse this value for all your future prints with the same substrate, although special care must be taken when using banners, as the shrinkage may vary up to 1% depending on the amount of ink used in the print.

You can expect the following variations from one print to another:

● Photorealistic, Paper-Solvent, Paper-Aqueous: less than 0.4%

● Self-Adhesive: less than 0.7%

● Banner: less than 1%

To solve the tiling problem and improve the repeatability of the printed size, you are recommended to ensure that the substrate-advance sensor is enabled in the RIP's substrate preset, as this will improve the stability of the prints over time. You are also recommended to tile together areas with similar amounts of ink. If this is not possible, print the areas with different amounts of ink as different jobs and modify the length of the job with less ink in the RIP to match its size with the job with high ink content.

Some RIPs may provide a scaling option that allows you to compensate easily for substrate shrinkage or expansion; see your RIP documentation.

The substrate has bow deformation

The following substrates may suffer from bow deformation during printing, as a result of which the print will appear curved.

● Self-adhesive vinyl substrates (some specific calendared vinyls only)

● Cellulose-based poster papers with no backing nor coating, including HP Photorealistic

This deformation may be particularly noticeable in the following applications.

● Printing images that will later be cut automatically or manually. When there is bow deformation, cutters that are aligned on the sides may lose alignment in the center.

● Poster printing, if the poster is framed or mounted on a straight surface.

The example below shows an original image, the substrate suffering from bow deformation, and the resulting print, also suffering from bow deformation.
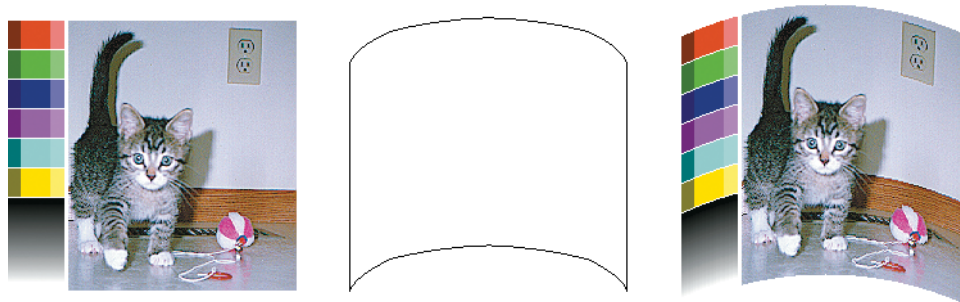
You can use the straightness optimization option in the front panel, or in your RIP software, to compensate for this effect and restore the original shape of your image.

● At the front panel, press , then , then **Ink** > **Image-quality maintenance** > **Straightness optimization**, and select a correction value from −15 to +15.

The chosen value should represent the vertical distance in millimeters that the centre of the substrate has moved with respect to the left and right edges. If the deformation moves the center of the substrate in the direction of substrate advance, the correction value should be negative; if in the reverse direction, the correction value should be positive. In practice, the required correction value is normally negative.

- To use the straightness optimization option from the RIP, please refer to your RIP documentation.

The automatic cutter does not work

The automatic cutter is turned off in any of the following cases.

- When it has been manually disabled from the front panel: press [i], then [wrench], then **Substrate** > **Substrate handling options** > **Cutter** > **Off**.

- When printing on some particularly heavy substrate types, which it cannot cut.

- When the take-up reel is enabled.

TIP: You can disable the take-up reel from the front panel by pressing [i], then [wrench], then **Substrate** > **Take-up reel** > **Enable take-up reel**.

- During double-sided printing.

Take-up reel substrate jam

If the substrate is severely damaged on the take-up reel, do not use the printer's cutter to cut and remove the substrate. Instead, cut the substrate manually as close as possible to the printer window, then remove the roll.

If the problem remains after removing the substrate jam, unload the take-up reel from the front panel and load it again.

Take-up reel does not wind

Predictably, if the take-up reel is not winding as anticipated, the printed output is likely to end up on the floor. If the printer recognizes a problem with the take-up reel, it interrupts the print job until the issue is corrected. If the printer does not recognize a problem, the job continues to print. The following table highlights possible issues and solutions.

Take-up reel LED status	Issue	Print job interrupted?	Possible cause	Possible solution
Blinking quickly	Take-up reel is not winding	Yes	The tension bar is in its lower position because the winding direction is not correct.	Change the winding direction using the winding-direction switch on the take-up reel motor. You may need to use the blue arrow buttons to collect substrate from the floor.
Blinking slowly	Take-up reel is not winding	No	The sensor cables are loose or unplugged.	Ensure that the sensor cables are correctly secured.
Solid red	Take-up reel is not winding	No	There is too much resistance on the take-up reel motor.	Ensure that nothing is blocking the substrate path or the tension bar.

Take-up reel LED status	Issue	Print job interrupted?	Possible cause	Possible solution
Solid green	Take-up reel is not winding	No	The winding-direction switch on the take-up reel motor is Off or in the wrong position.	Ensure that the switch is On, and select the correct winding direction (1 or 2).
Solid green	Take-up reel is winding in the wrong direction	No	The winding-direction switch on the take-up reel motor is in the wrong position.	Change the switch to the correct position.

15 Troubleshoot ink-system issues

Ink maintenance kit needs to be installed

If the front panel tells you that the ink maintenance kit needs to be installed, it means that the kit has not been installed in your printer. Perform the normal procedure for replacing the ink maintenance kit (see Replace the ink maintenance kit on page 105), except that you will not need to remove the old kit.

Cannot insert an ink cartridge

1. Check that you have the correct type of cartridge (model number).

2. Check that the colored label on the cartridge is the same color as the label on the slot.

3. Check that the cartridge is correctly oriented, the arrow on the front of the ink cartridge should face upwards.

⚠ **CAUTION:** Never clean inside the ink cartridge slots.

Cannot insert a printhead

1. Check that you have the correct type of printhead (model number).

2. Check that you have removed the orange protective caps from the printhead.

3. Check that the colored label on the printhead is the same color as the label on the slot.

4. Check that the printhead is correctly oriented (compare with the others).

5. Check that you have closed and latched the printhead cover.

Cannot insert the printhead cleaning cartridge

Check that the printhead cleaning cartridge has the correct model number and is correctly oriented.

Front panel recommends reseating or replacing a printhead

1. Remove the printhead and check that it is free from physical damage and from ink stains on the electrical connections.

2. If necessary, clean the electrical connections between the printhead and the carriage. See Clean the electrical connections on a printhead on page 92.

3. Reinsert the printhead into the carriage and check the front panel message.

4. If the problem persists, insert a new printhead.

Clean the printheads

Periodic printhead cleaning is performed automatically, as long as the printer is kept turned on. However, you should clean the printheads if you are experiencing poor image quality and cannot resolve the issues by other methods. This ensures that there is fresh ink in the nozzles and helps to prevents nozzle clogs.

If you have printed the printhead status plot, you know which colors are failing. Clean the pair of printheads that are not performing adequately. If you are not sure which printheads to clean, clean all of the printheads.

NOTE: A small number of blocked nozzles are unlikely to have any visible effect on your prints, as the printer has been designed to compensate for this problem during multi-pass printing.

To clean the printheads, go to the printer's front panel and press ![info icon], then ![wrench icon], then **Ink** > **Image-quality maintenance** > **Clean printheads**, then select which printheads you want to clean. You can clean all of the printheads or only some of them. The choices are as follows.

- Print test plot

- Clean all

- Clean LC-C

- Clean Y-K

- Clean LM-M

Cleaning all printheads takes about 5 minutes. Cleaning any two printheads takes about 3 minutes.

NOTE: Cleaning all printheads uses more ink than cleaning a single pair.

Align the printheads

Precise alignment between printheads is essential for color accuracy, smooth color transitions, and sharp edges in graphical elements. Your printer has an automatic printhead alignment process which runs whenever a printhead has been reseated or replaced.

In the case of a substrate jam, if you have used a custom substrate, or if you are experiencing problems with color accuracy; you might need to align the printheads. See Align the printheads on page 89.

NOTE: If you experience a substrate jam, HP recommends that you reseat and align the printheads.

TIP: Use the same substrate you intend to print on to align the printheads.

WARNING! Colored substrates, glossy canvas, and transparent materials such as translucent bond, clear film, tracing paper, and vellum are not suitable for aligning the printheads. However, if you must perform printhead alignment with a material that is not supported, make sure you use a material with the same thickness as the material you are going to use for printing.

Reinsert printheads procedure

1. If the printhead alignment process is running and the wrong substrate is loaded, press the Cancel button on the front panel.

   ⚠ **CAUTION:** Do not print if the printhead alignment process has been canceled.

2. Load the substrate you want to use. Self-adhesive vinyl is recommended for the best results with printhead alignment.

   ⚠ **WARNING!** Colored substrates, glossy canvas, and transparent materials such as translucent bond, clear film, tracing paper, and vellum are not suitable for aligning the printheads. However, if you must perform printhead alignment with a material that is not supported, make sure you use a material with the same thickness as the material you are going to use for printing.

3. Remove and reinsert all of the printheads. See . This starts the printhead alignment process.

   📝 **NOTE:** Make sure the printer window is closed during printhead alignment.
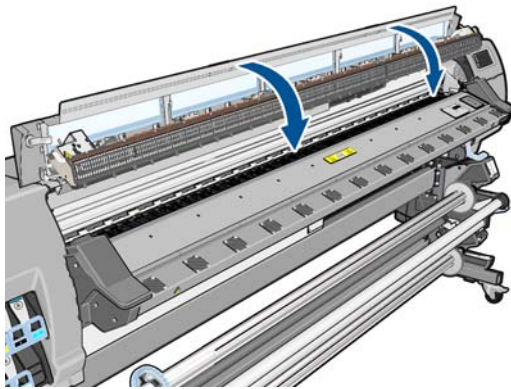
4. The process takes about 6 minutes. Wait until the front panel shows that the process is complete before using the printer.

   📝 **NOTE:** A calibration image is printed during the printhead alignment process. The front panel shows if there were any errors in the process.

Image Quality Maintenance menu procedure

1. Load the substrate you want to use. Self-adhesive vinyl is recommended for the best results with printhead alignment. Plain; bond; and thin, coated substrates are acceptable, but provide marginal results.

   ⚠ **WARNING!** Colored substrates, glossy canvas, and transparent materials such as translucent bond, clear film, tracing paper, and vellum are not suitable for aligning the printheads. However, if you must perform printhead alignment with a material that is not supported, make sure you use a material with the same thickness as the material you are going to use for printing.

2. Go to the front panel and press [icon], then [icon], then **Ink** > **Image-quality maintenance** > **Align printheads** > **Auto PH alignment**. The printer verifies that a sufficient amount of substrate exists to perform printhead alignment.

3. If the substrate type that is loaded is acceptable for printhead alignment, the printer performs the alignment and prints an alignment pattern.

> **NOTE:** Make sure the printer window is closed during printhead alignment.
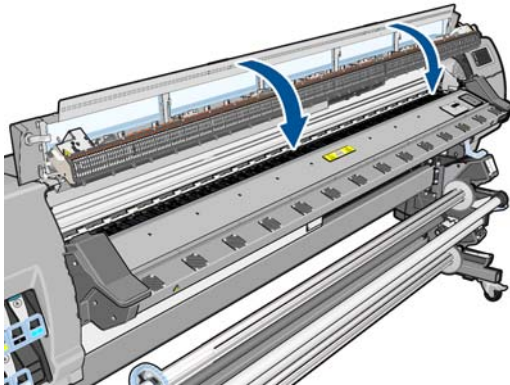
4. The process takes about 5 minutes. Wait until the front panel shows that the process is complete before using the printer.

Scan errors during alignment

If the alignment process fails, a **Scanning problems** message appears on the front panel. This indicates that the alignment was not completed successfully. Therefore, the printheads are not aligned and the alignment should be repeated before printing. The problem might be because of one of the following scenarios:

- The type of substrate used in the printhead alignment process was not acceptable. Repeat the alignment process using one of the recommended substrate types.

- The printheads are not clean. Clean the printheads. See Clean the printheads on page 142.

- The printer window was open during the printhead alignment process. Repeat the alignment process with the printer window closed.

If the problem persists after following the recommended remedies, try replacing all of the printheads. If the problem persists after replacing the printheads, a failure in the scanning system may exist.

16 Troubleshoot other issues

The printer cannot get an IP address

If your network has no DHCP server, the printer cannot automatically retrieve an IP address. In this case, you must set the printer's IP address manually, in the following way.

1. From the front panel, press ![icon], then ![icon], then **Setup** > **Network connectivity** > **Gigabit Ethernet** > **Modify configuration** > **TCP/ IP** > **IPV4 settings** > **Config method** > **Manual**.

2. From the IPV4 Settings menu, select **Manual settings** > **IP address**.

3. Enter the IP address that you wish to use, and press the OK key when finished.

Cannot access the Embedded Web Server

If you have not done so already, please read the instructions in .

1. Go to the front panel and press ![icon], then ![icon], then **Setup** > **Connectivity** > **Advanced** > **Embedded Web Server** > **Allow EWS** > **On**.

2. Press ![icon], then ![icon], then **Setup** > **Connectivity** > **Network information**.

3. The information should read: **IP enabled: Yes**. If it does not, you might need to use a different connection.

If you still cannot access the Embedded Web Server, turn the printer off with the Power button on the front panel and then turn it on again.

If you experience very slow progress while trying to access the Embedded Web Server, the problem could be that you are using a proxy server. Try bypassing the proxy server and accessing the Embedded Web Server directly.

- In Internet Explorer 6 for Windows, go to **Tools** > **Internet Options** > **Connections** > **LAN Settings**, and select the **Bypass proxy server for local addresses** check box. Alternatively, for more precise control, click the **Advanced** button and add the printer's IP address to the list of exceptions, for which the proxy server is not used.

- In Firefox 3.0 for Windows, go to **Tools** > **Options** > **Network** > **Connection** > **Settings**, and select the **Direct connection to the Internet** check box. Alternatively, when the **Manual proxy configuration** check box is selected, add the printer's IP address to the list of exceptions, for which the proxy server is not used.

- In Firefox 2.0 for Linux, go to **Edit** > **Preferences** > **Network** > **Connection** > **Settings**, and select the **Direct connection to the Internet** check box. Alternatively, when the **Manual proxy configuration** check box is selected, add the printer's IP address to the list of exceptions, for which the proxy server is not used.

The printer is not printing

Possible reasons why a file you have sent from your computer is not printing when expected, include the following:

- There may be a problem with the electrical power. If the printer is not performing and the front panel does not respond, check that the power switch at the rear is on, the residual current circuit breakers are up, the power cable is correctly connected, and the electrical socket is providing power.

- Unusual electromagnetic phenomena may exist, such as strong electromagnetic fields or severe electrical disturbances. Such occurrences can cause the printer to behave strangely, or even stop working. Turn off the printer by using the Power button on the front panel, wait until the electromagnetic environment has returned to normal, then turn the printer on again. If the problems persist, call your service representative.

- One of the following substrate scenarios may exist:

  ◦ The substrate name that appears on the front panel does not reflect the substrate that is loaded in the printer.

  ◦ There is not a sufficient amount of substrate on the loaded roll to print the entire job.

  Under these conditions, one print job might be printed, while another print job is held in the print queue. To resolve this issue, unload the roll from the printer and load a new roll, using the front panel to guide you through the process.

The software program slows down or stalls while generating the print job

Large quantities of data might be necessary to generate a high-quality large-format print job. This can cause your software program to slow down significantly or stall. Lowering the print resolution may help to avoid this scenario, however, lowering the print resolution reduces image quality.

The printer seems slow

Here are some possible explanations.

- If you request the highest possible print quality in the RIP, printing will be relatively slow compared with draft-quality printing.

- Check that the substrate loaded in the printer belongs to the substrate family that appears on the front panel.

- Is your printer connected to a network? Check that all components used in the network (network interface cards, hubs, routers, switches, and cables) are capable of Gigabit Ethernet operation. Is there a lot of traffic from other devices on the network?

- Are the printheads in good condition? Printing time tends to increase when a printhead needs cleaning. Check the printhead status on the front panel or through the Embedded Web Server. Clean or replace printheads if necessary.

- Does your image contain high-density black fills? That may increase printing time.

See also Printer states on page 79.

Communication failures between computer and printer

Some symptoms are:

- The front-panel display does not show the **Receiving** message when you have sent an image to the printer.

- Your computer shows an error message when you try to print, such as error 61:09 or 63:05. See Front-panel error messages on page 149.

- Your computer or printer stalls when transferring data.

To solve a communication problem:

- Make sure that you have selected the correct printer in your RIP.

- Remember that large images usually require more time to receive, process, and print.

- If the printer is connected to your computer through any other intermediate devices, such as switch boxes, buffer boxes, cable adapters, or cable converters, remove the intermediate device and try connecting the printer directly to your computer.

- Try another interface cable.

- Try changing the I/O timeout, which specifies the time that an idle connection is allowed to remain open when the printer is waiting for a remote computer. The default value is 30 seconds. If set to zero, the timeout is disabled and the connection is allowed to remain open indefinitely. To change the I/O timeout, go to the front panel and press ![icon], then ![icon], then **Setup** > **Connectivity** > **Advanced** > **I/O timeout**.

The platen rollers squeak

If you notice that the platen rollers are squeaking, call HP support for help: http://welcome.hp.com/country/us/en/wwcontact_us.html

17 Front-panel error messages

Under certain circumstances, a numeric error code appears on the front panel. Follow the advice in the Recommendation column to resolve the error. If the recommendation does not seem to solve the problem, call your service representative. See .

If an error code appears on the front panel that is *not* included in this list, turn off the printer and then turn it back on. If the problem persists, call your service representative.

Table 17-1 Numeric error messages

Error code	Recommendation
14.32:01, 14.52:01, 14.72:01	Zero voltage detected. Check the Residual Current Circuit Breakers at the back of the printer. Check the input voltage(s).
14.33:01, 14.53:01, 14.73:01	Very low voltage detected. Check the input voltage(s).
14.34:01, 14.54:01, 14.74:01	Low voltage detected. Check the input voltage(s).
14.35:01, 14.55:01, 14.75:01	Excessive voltage detected. Check the input voltage(s).
15.01:00, 16.01:00	The printer is unable to warm up within a preset time limit. Decrease the warm-up temperature by using the **Warm-up drying temp offset** (15.01:00) or the **Warm-up curing temp offset** (16.01:00) options in the RIP substrate profile. Check that the ambient temperature and input voltage(s) are within printer specifications.
15.02:00, 16.02:00	The printer is unable to cool down within a preset time limit. Increase the cool-down temperature by using the **Cool-down drying temp offset** (15.02:00) or the **Cool-down curing temp offset** (16.01:00) options in the RIP substrate profile. Check that the ambient temperature is within printer specifications. Check that all fans are working and unblocked.
15.03:00, 16.03:00	Excessive heat in the printer. Reduce the drying power by using the **Minimum drying power** (15.03:00) option in the RIP substrate profile. Reduce the drying or curing temperatures by using the **Drying temp** (15.03:00) or **Curing temp** (16.03:00) options in the RIP profile. Check that the ambient temperature is within printer specifications. Check that all fans are working and unblocked.
15.04:00, 16.04:00	Insufficient heat in the printer. Check that the ambient temperature is within printer specifications.
15.05:00, 16.05:00	Infrared sensor error. Check that all fans are working and unblocked.
15.06:00, 16.06:00	The printer has been operating at maximum power for too long. Check that the ink quantity is not too high. Check that the ambient temperature is within printer specifications.
21.2:10	Printhead cleaning cartridge error. Turn the printer off, remove the printhead cleaning cartridge and check whether the cloth can be manually advanced by using the white gears on its right-hand side. If so, reinsert it. If not, try a new printhead cleaning cartridge. Turn the printer on.
24:03	The setup procedure has not been completed. Restart the printer, then restart the setup procedure from the beginning.
26.n:01 (where n = the ink cartridge number)	Remove the ink cartridge and reinstall it in the printer. If the error persists, replace the cartridge with a new one.
27.n:01 (where n = the printhead slot number)	The calibration was not performed because one or more printheads are malfunctioning. Use the printhead status plot to find out which printheads are malfunctioning, and replace them.

Table 17-1 Numeric error messages (continued)

Error code	Recommendation
29:01	The printhead cleaning cartridge is not inserted correctly. Open the printhead cleaning cartridge door on the right side of the printer, make sure that the printhead cleaning cartridge is correctly seated, then close the door. If the problem persists, replace the printhead cleaning cartridge.
32:01	The take-up reel is disconnected. If you want to use the take-up reel, turn off the printer and ensure that all take-up reel cables are connected (sensor cables, printer cable). If you do not want to use it, you may need to unload the substrate manually from the take-up reel. Remember to cut the substrate first, either manually or by using the **Form feed and cut** option in the front panel's **Substrate** menu.
32:01.2	This error occurs when the tension bar stays in one of its sensor trigger positions for more than 8 seconds. The most likely causes of this error are as follows.
	• The winding-direction switch on the take-up reel motor is activated, but substrate has not been taped to the take-up reel yet.
	• The wrong take-up reel winding direction has been selected.
	• Something is blocking the movement of the tension bar.
	• The substrate is not following the correct path between the tension bar and the diverter.
32:02	This error occurs during printer initialization, to warn you that the take-up reel has been disconnected while the printer was turned off. It also occurs if you try to enable the take-up reel, but it is not connected to the printer. Connect the take-up reel to the printer and press OK to continue.
41:03	Open the printer window and make sure that there are no obstacles restricting the movement of the drive roller. If the substrate has jammed and is restricting the movement of the drive roller, see The substrate has jammed on page 134.
42:03	Turn off the printer using the front panel and the power switch at the rear. Open the window and check for any visible obstacles restricting the movement of the printhead carriage. If there is a wrinkled mass of substrate blocking the carriage, lift the substrate adjustment lever and clear the obstruction. Turn the printer on again.
44:10	The waste management fan has failed.
44.1:01	The waste management system cable is disconnected; the cable from the printer cover to the interconnect could be disconnected too.
44.2:01	A switch has failed. Check the waste management system: the ink tube assembly should be connected and the ink filter door closed.
44.4:01	There is noise in the signal of the waste management system. Check that the connector is properly connected.
52:01	Problem with the drop detector. Check that the ink funnel is correctly installed. Use the 'Replace ink maintenance kit' process (see Replace the ink maintenance kit on page 105) to access the funnel. Check that there is no obstruction (such as substrate) in the funnel that could block the detector signal.
61:01	The file format is incorrect and the printer cannot process the job. Try the following remedies:
	• Make sure that the RIP supports the printer and that the printer driver is installed in the RIP.
	• Check that you are using the latest version of your RIP.
	• Resubmit the file to the printer.
	• Check that your printer firmware is up to date. See Firmware update on page 87.
61:08.2	The job contains format errors or incorrect setting values. Resend the file to the printer.
61:09	Unexpected end of job; communication lost with RIP. Check that all relevant cables are properly connected and check whether the RIP has displayed any error message. Resend the file to the printer.

Table 17-1 Numeric error messages (continued)

Error code	Recommendation
63:04	An input/output problem has occurred with the network card. Try the following remedies: ● Make sure that the network cable is correctly connected to the network card. ● Check that your printer firmware is up to date. See Firmware update on page 87.
63:05	The job is reaching the printer too slowly. The printer cancels the job if there are long pauses of more than 20 s. Try the following remedies: ● Make sure that a 1 Gigabit Ethernet card is correctly installed in the computer with the RIP. ● Check the RIP for any error messages. Check that the computer with the RIP is working correctly and has the minimum specification required by the RIP. Check that the hard disk is neither full nor excessively fragmented. ● Check whether the option **RIP while printing** is enabled. This option can cause slow printing if the computer is not sufficiently powerful. ● Try reducing the resolution of the job or increasing the number of passes.
71:03	Out of memory. Switch the power off from the rear of the printer and disconnect the power cord. Reconnect the power cord and power on the printer.
74:01	An error occurred when uploading the firmware update file. Try the following remedies: ● Turn off the printer by using the Power key on the front panel and the power switch at the back of the printer. Disconnect the power cord, then reconnect the power cord and turn on the printer. ● Try again to upload the firmware update file to the printer. See Firmware update on page 87.
77:04	An Embedded Web Server internal software error has occurred. Try the following remedies: ● Turn off the printer by using the Power key on the front panel and the power switch at the back of the printer. Disconnect the power cord, then reconnect the power cord and turn on the printer. ● Check that your printer firmware is up to date. See Firmware update on page 87.
78.1:04	The printer has no substrate preset for this substrate. Follow the firmware upgrade procedure to update the printer with the latest substrate presets.
78.2:01	The back tension is lost. This could be due to a loose roll core or an imminent end of roll. If these are not the causes, try unloading and reloading the substrate.
81:01, 81:03	Open the printer window and make sure that there are no obstacles restricting the movement of the drive roller. If the substrate has jammed and is restricting the movement of the drive roller, see The substrate has jammed on page 134.
82:01	There may be a substrate jam, or a dirty carriage reflector. Try cleaning the carriage reflector; if the problem persists, see The substrate has jammed on page 134.
86:01	Open the window and check for any visible obstacles restricting the movement of the printhead carriage. If there is a wrinkled mass of substrate blocking the carriage, lift the substrate adjustment lever and clear the obstruction. Check that the carriage rail is clean and lubricated. If not, clean and lubricate it: see Clean and lubricate the carriage rail on page 90.
98:03	One or more printheads are malfunctioning. Use the printhead status plot to find out which printheads are malfunctioning, and replace them. See Use the printhead status plot on page 123.

Printer logs

If you go to the front panel and press ![info icon] , then ![wrench icon] , then **Setup** > **Printer logs**, you can choose to display on the front panel a log of recent system errors, warnings, or printhead or ink cartridge events.

18 When you need help

Introduction

HP Customer Care offers award-winning support to ensure that you get the most from your HP Designjet. HP Customer Care provides comprehensive, proven support expertise and new technologies to give you unique end-to-end support. Services include setup and installation, troubleshooting tools, warranty upgrades, repair and exchange services, phone and Web support, software updates, and self-maintenance services. For more information about HP Customer Care, go to: http://www.hp.com/go/graphic-arts/.

Documentation

The following documents are provided with your printer, and can also be downloaded from http://www.hp.com/go/L28500/manuals/.

- *Introductory information*

- *User's guide*, including maintenance and troubleshooting information

- *Legal information*

- *Limited warranty*

NOTE: The *User's guide* can also be viewed on the printer's front panel by pressing the ? icon.

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, easy to use

- An HP Support Specialist will diagnose and assess whether a replacement part is required to address a defective hardware component.

- Replacement parts are express-shipped; most in-stock parts are shipped the very same day you contact HP.

- Available for most HP products currently under warranty or contract.

- Available in most countries.

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

HP Customer Care Centers

Help is available to you by telephone. What to do before you call:

- Review the troubleshooting suggestions in this guide.

- Review your RIP's documentation, if relevant.

- Please have the following information available:

    ◦ The printer you are using: the product number, the serial number and the service ID

    > **NOTE:** This information is available from the front panel: press ▢, then ▭, then
    >
    > ▭ . You may also find it on a label at the rear of the printer.

    ◦ If there is an error code on the front panel, note it down; see Front-panel error messages on page 149

    ◦ The RIP you are using, and its version number

    ◦ The software application you are using, and its version number

    ◦ The text displayed by the Embedded Web Server when you select **Help** > **About**

Telephone number

Your HP Support telephone number is available on the Web: please visit http://welcome.hp.com/country/us/en/wwcontact_us.html.

Service information

The printer can produce on request a list of many aspects of its current status, some of which may be useful to a service engineer trying to fix a problem. There are two different ways to request this list:

- In the Embedded Web Server, select the **Support** tab and then **Service support** > **Printer information**.

- From any computer with Internet access, enter the URL of your printer into a Web browser, followed by `/hp/device/webAccess/allServicePlot.htm`. For instance, if the URL of your printer is **http://123.123.123.123**, enter `http://123.123.123.123/hp/device/webAccess/allServicePlot.htm`.

You can request the whole list, which takes a significant time to generate; or you can request specific parts of it. If in doubt, you are recommended to request the whole list (select **All pages**).

If you need to send the list by e-mail, you can save the page as a file from your Web browser, and later send the file. Alternatively, from Internet Explorer you can send the page directly: select **File** > **Send** > **Page by E-mail**.

19 Printer specifications

Functional specifications

Table 19-1 HP No. 792 ink supplies

Printheads	Yellow/black, cyan/light cyan and light magenta/magenta
Ink cartridges	Yellow, black, magenta, light magenta, cyan and light cyan. All cartridges contain 775 ml of ink.
Printhead cleaning kit	Non-color-specific
Ink tube assembly	Non-color-specific
Ink filter	Non-color-specific

Table 19-2 Substrate sizes

	Minimum	Maximum
Width	584 mm (23 in) Narrow substrate: 254 mm (10 in)	2642 mm (104 in)
Length	1.5 m (59 in)	Roll with maximum external diameter of 250 mm (9.8 in)
Weight		100 kg (220 lb)

The substrate core diameter is 76.2 mm (3 in).

Table 19-3 Print resolutions

Ink level	Number of passes	Halftone resolutions (dpi)	Print resolutions (dpi)
50%	2	300	600×1200
100%	4–28 (except 18)	300, 600	1200×1200
	18	1200	1200×1200
200%	10–28 (except 18)	300, 600	1200×1200
	18	1200	1200×1200

The table above shows the resolutions supported by the printer. See your RIP documentation to find the resolutions supported by your RIP.

NOTE: The Speed print modes are available only up to 100% ink level and 600×1200 dpi print resolution.

Table 19-4 Printing speeds

Passes	Carriage speed	Approximate printing speed (m²/h)		
		2.64 m (104 in) wide	**1.98 m (78 inch) wide**	**1.52 m (60 inch) wide**
2	Speed	70.0	60.0	55.3
2	Std	55.0	49.1	44.4
4	Speed	38.0	34.0	28.8
4	Std	28.0	25.1	23.2
6	Speed	28.0	24.2	21.0
6	Std	18.6	16.7	15.8
8	Speed	18.4	16.4	14.2
8	Std	13.9	12.0	11.3
10	Speed	14.7	13.4	11.9
10	Std	11.2	9.8	9.0
12	Speed	12.3	11.2	9.9
12	Std	9.0	8.4	7.6
16	Speed	9.2	8.4	7.5
16	Std	7.4	6.7	6.4
18 uni	Std	…	…	3.4
20–28	Std	…	…	…

NOTE: In the above table, printing is bidirectional, except in the 18-pass mode, which is unidirectional only.

NOTE: Environmental conditions, job length, and ink density influence the maximum speed you can achieve with a particular print mode. Special-purpose options such as **Extra PH cleaning** and **Inter-pass drying time** also have an effect on printing speed.

Table 19-5 Margins

Side margins	5 mm (0.2 in)
Top margin (leading edge)	5 mm (0.2 in)
Bottom margin (trailing edge)	5 mm (0.2 in) (none)
	100 mm (3.9 in) (small)
	150 mm (5.9 in) (normal)
	200 mm (7.9 in) (extra)
	300 mm (11.8 in) (extra)
	400 mm (15.7 in) (extra)
	500 mm (19.7 in) (extra)

Physical specifications

Table 19-6 Printer physical specifications

Weight (including stand)	380 kg (837 lb)
Width	3581 mm (141 in)
Depth	730 mm (28.7 in)
Height	1377 mm (54.2 in)

Memory specifications

Table 19-7 Memory specifications

Virtual memory	32 GB
Physical memory (DRAM)	512 MB
Hard disk	160 GB

Power specifications

NOTE: An electrician is required for the setup and configuration of the building's electrical system used to power the printer and also for printer installation. Make sure that your electrician is appropriately certified according to local regulations and supplied with all the information regarding the electrical configuration.

Your printer requires that the following electrical components be supplied and installed by the customer, according to the National Electrotechnical Code (NEC).

NOTE: Remember that you are required to follow the local laws, regulations and standards that pertain to the electrical installation of your printer.

The electrical specifications for the three-phase line are included in the following table, depending on the line-to-line input voltage available at the site. Use the appropriate specification for your site.

Table 19-8 Three-phase line specifications

Input voltage (line to line)	380-415 V~ (-10%+6%)	200-240 V~ (±10%)
Number of power wires	5 (3 + 1 neutral + 1 PE)	4 (3 + 1 PE)
Input frequency	50/60 Hz ± 3Hz	50/60 Hz ± 3Hz
Power consumption (warming up)	8 − 10 kW	8 − 10 kW
Power consumption (printing)	4.2 kW	4.2 kW
Maximum load current (per phase)	24 A	40 A

Environmental specifications

Table 19-9 Printer environmental specifications

Relative humidity range for best print quality	40−60%, depending on substrate type
Relative humidity range for printing	30−80%, depending on substrate type
Temperature range for best print quality	18 to 25°C (64 to 77°F), depending on substrate type

Table 19-9 Printer environmental specifications (continued)

Temperature range for printing	15 to 30°C (59 to 86°F), depending on substrate type
Temperature range when not in operation	–25 to +55°C (–13 to +131°F)
Temperature gradient	no more than 10°C/h (18°F/h)
Maximum altitude when printing	3000 m (10000 ft)

NOTE: The printer must be kept indoors.

NOTE: If the printer or ink cartridges are moved from a cold location to a warm and humid location, water from the atmosphere can condensate on the printer parts and cartridges and can result in ink leaks and printer errors. In this case, HP recommends that you wait at least 3 hours before turning on the printer or installing the ink cartridges, to allow the condensate to evaporate.

Acoustic specifications

Table 19-10 Printer acoustic specifications

Idle sound power	$\leq$ 6.7 B (A)
Operating sound power	$\leq$ 8.0 B (A)
Idle sound pressure	$\leq$ 45 dB (A)
Operating sound pressure	$\leq$ 61 dB (A)

A Summary of common printing problems

This is a table of common problems and the RIP parameters that can be changed in order to solve the problem. Some possible side-effects are also shown. For a more detailed treatment of any particular problem, please see the relevant chapter in this guide.

Problem	Parameter	Change	Possible side-effects
Durability problems, ink smudges or oily finish	Curing temperature	Increase	Substrate jam, substrate damage, ink smears
	Number of passes	Increase	Slower printing
	Inter-pass delay	Increase	Slower printing
Substrate jam, substrate damage, ink smears	Curing temperature	Decrease	Less durability (smudges), oily finish
	Vacuum (and disable cutter)	Increase	Substrate skew
	Top and/or bottom margins	Increase	Substrate waste
	Drying temperature	Decrease	Coalescence, banding, less durability (smudges), oily finish
Vertical banding in saturated area fills	Drying temperature	Increase	Substrate jam, substrate damage, ink smears
	Ink limits	Decrease (depends on RIP)	Reduced color gamut
	Inter-pass drying time	Increase	Slower printing
	Number of passes	Increase	Slower printing
	Carriage speed	Decrease	Slower printing
	Cutter	Disable	Manual substrate advance may be needed to avoid crashes with some substrates
	Group jobs together	Yes	Avoids white space between prints
	Modify the print queue	Avoid difficult areas at the end of the queue, and sudden changes of ink limits while printing	
Horizontal banding in saturated area fills	Drying temperature	Increase	Substrate jam, substrate damage, ink smears
	Ink limits	Decrease (depends on RIP)	Reduced color gamut
	Inter-pass drying time	Increase	Slower printing
	Number of passes	Increase	Slower printing
	Carriage speed	Decrease	Slower printing
	Modify color separations and dark color generation		

Problem	Parameter	Change	Possible side-effects
Vertical banding in low-to-medium area fills	Drying temperature	Decrease	Slight color differences and/or horizontal banding at edges (increase inter-pass drying time/ number of passes or decrease carriage speed to fix this)
	Align printheads		
	Ink limits	Increase (depends on RIP)	
	Inter-pass drying time	Increase	Slower printing
	DNX	Activate	Grainy aspect
	Take-up reel	Use	
	Modify the print queue	Avoid difficult areas at the end of the queue, and sudden changes of ink limits while printing	
	Roll back tension	Increase	Grain and/or horizontal banding may appear if too high
	Warming duration	Increase	Causes some delay
Graininess, color misregistration or lack of sharpness	Align printheads		
	Calibrate substrate advance		
Black areas look hazy or image gloss is not uniform	Modify color separations and dark color generation		
	Drying temperature	Increase	Substrate jam, substrate damage, ink smears
	Number of passes	Increase	Slower printing
	Curing temperature	Decrease	Less durability (smudges), oily finish

Glossary

Airflow
Air is blown through the printing zone to speed up the drying process.

Back tension
The backwards tension applied to the substrate by the input spindle, which must be constant across the width of the substrate. Too much or too little tension may cause substrate deformation and print quality defects.

Bidirectional
Bidirectional printing means that the printheads print while moving in both directions. This increases the speed of printing.

Bleeding
A print-quality defect that occurs when the ink spreads on the substrate across areas of different colors.

Coalescence
A print-quality defect that occurs when the ink spreads on the substrate within an area of the same color.

Cockle
A substrate condition in which it is not lying perfectly flat, but rises and falls slightly in shallow waves.

Color accuracy
The ability to print colors that match the original image as closely as possible, given the fact that all devices have a limited color gamut and might not be able to match certain colors precisely.

Color consistency
The ability to print the same colors in a particular print job, from print to print and from printer to printer.

Curing
The substrate is heated in the curing zone to coalesce the latex, creating a polymeric film which acts as a protective layer, while at the same time removing the remaining co-solvents from the print. Curing is vital to ensure the durability of the printed images. Too high or too low a curing temperature may cause print quality defects.

Cutter
A printer component that slides back and forth across the platen to cut the substrate.

Drying
The substrate is heated in the printing zone to dry the ink and fix the image to the substrate. Too high or too low a drying temperature may cause print quality defects.

Edge holder
A metal piece designed to prevent the edge of the substrate from rising while printing is in progress.

Firmware
Software that controls your printer's functionality and is stored semi-permanently in the printer (it can be updated).

Gamut
The range of colors and density values reproducible on an output device, such as a printer or monitor.

HDPE
High Density Polyethylene.

I/O

Input/Output: this term describes the passing of data between one device and another.

ICC

The International Color Consortium, a group of companies that have agreed on a common standard for color profiles.

Ink density

The relative amount of ink that is deposited on the substrate per unit of area.

IP address

A unique identifier that identifies a particular node on a TCP/IP network. It consists of four integers separated by dots.

LED

Light-Emitting Diode: a semiconductor device that emits light when electrically stimulated.

Loading accessory

A flexible plastic accessory that fits over the leading edge of the substrate while it is being loaded into the printer. Some substrates are difficult to load without this accessory.

Media preset

The media preset contains the ICC color profile, which describes the color characteristics of the substrate. It also contains information about other characteristics (RIP and printer settings, such as drying and curing temperatures, vacuum pressure and substrate advance compensation) and requirements of the substrate that are not directly related to color. Media presets for your printer are installed in the RIP.

Minimum drying power

The minimum heat applied in the printing zone so that the substrate does not cool too much in lightly-inked areas. Low minimum power may cause print quality defects; high minimum power may damage the substrate, especially with a high number of passes and in blank or lightly-inked areas.

Nozzle

One of many tiny holes in a printhead through which ink is deposited onto the substrate.

OMAS

The Optical Media Advance Sensor, otherwise known as the substrate-advance sensor. The sensor located in the print platen that tracks the substrate movement and increases its accuracy.

Passes

The number of print passes specifies how many times the printheads will print on the same area of substrate. A higher number of passes tends to improve print quality and printhead health, but reduces the speed of printing.

PC

Polycarbonate.

PE

Polyethylene.

PET

Polyethylene Terephthalate (polyester).

PLA

Polylactic Acid.

Platen

The flat surface within the printer over which the substrate passes while it is being printed on.

PP

Polypropylene.

Printhead

A removable printer component that takes ink of one or more colors from the corresponding ink cartridge(s) and deposits it on the substrate, through a cluster of nozzles.

PVC

Polyvinyl Chloride.

Spindle

A rod that supports a roll of substrate while it is being used for printing.

Substrate

A thin, flat material designed to be printed on, made of paper or other materials.

Substrate advance compensation

A slight adjustment to the amount of substrate advance between print passes, to compensate for the characteristics of different substrate types. The printer normally performs this adjustment automatically, but may need to be recalibrated for substrates not supported by HP, or for an unusual ambient temperature or humidity. Incorrect substrate advance compensation may cause banding with fewer than 8 passes, or graininess with 8 passes or more.

Substrate-advance sensor

The sensor located in the print platen that tracks the substrate movement and increases its accuracy. Otherwise known as OMAS (Optical Media Advance Sensor).

Tension bar

A cylindrical weight inserted into the loop of substrate required by the take-up reel.

Unidirectional

Unidirectional printing means that the printheads print only while moving in one direction. The speed of printing is lower than in bidirectional. In general, print bidirectional and increasing the number of passes is a better way of improving print quality.

Vacuum pressure

The substrate is held flat against the platen by vacuum suction. Too much or too little suction may cause print quality defects. Too little suction may also cause a substrate jam or damage the printheads.

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