Folding carton packaging with HP PageWide XL Pro

This document will explain how to print, cut and assemble folding carton packaging boxes using HP PageWideXL Pro printers.

What you will need

- Before printing
  - What you will need
  - Preparing the substrate
  - Preparing the job
- Printing
  - The printing process
- After printing
  - Post-print finishing
  - Installation

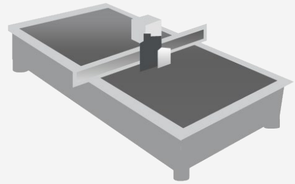
Inkjet treated or uncoated paperboards (200-600gsm)

SW tools (RIP, edition, etc.)

PageWide XL Pro printer

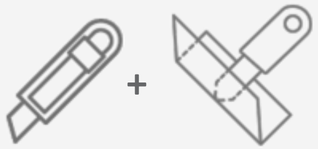
Sheet Feeder & Pro Stacker (optional)

Cutting & creasing device



Digital cutting table (optional)

OR

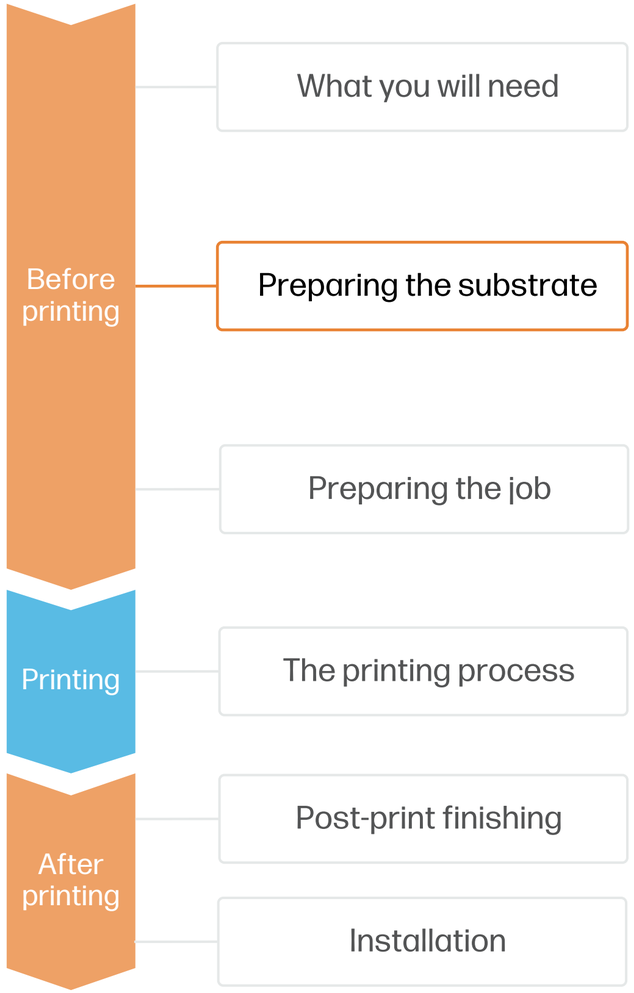


Utility knife + creasing tool

Film laminate (optional)

Film laminator (optional)

Preparing the substrate



1. Types of substrates for folding carton packaging

- Folding carton boxes are typically created using **paperboards,** which are heavy-weight paper grades that are stiff and crack-resistant.
- Paperboards are available in many grades & formats:
  - **Grade:** For eye-catching saturated colors, look for paperboards that are treated for aqueous pigment inks (typically classified as “Inkjet”). You can also use uncoated paperboards for a more natural feel.
  - **Thickness & Weight:** Lighter and thinner paperboard grades (200 - 400gsm | 10 – 20pt) work great for small boxes, while heavier and thicker grades (400 - 600gsm | 20 - 40pt) provide better support and protection for larger products.
  - **Size:** The printer accepts sheet sizes between A2 (420 × 594mm) up to B1 (707 × 1000mm).
- You can find a list of compatible paperboards that have been tested by HP in the HP Media Locator.
- The substrate used to create the samples on this guide is the Kohlschein Inkjet Pro Matt.

IMPORTANT: Clay-coated boards (SBS, SUS/CUK, CCNB, FBB, CRB, C1S or C2S) are not compatible with PageWideXL inks. Corrugated cardboard may cause crashes, and it’s not recommended.

NOTE: Check the HP PageWideXL Pro - Substrates training kit for a detailed explanation on how to choose the right media substrate to fit your needs.

2. Usage

- Print **on-demand highly customizable boxes**, produce short runs of personalized and branded packaging while enjoying all the versatility of digital printing and PageWideXL’s quick turnaround times.
- Folding carton boxes do not usually require extra protection. However, for **long-term** use cases you can protect the boxes using **film lamination**.

Preparing the substrate

3. Storage

Store the paperboards horizontally in a flat surface and in their original packaging. Keep them in a clean, dust-free environment, within the temperature and humidity range specified on the paper label. If the label gives no specification, try to store the sheets at 20°C and a relative humidity of 40–60%.

Avoid stacking too many sheets on top of each other, as pressure can deform them.

Allow papers to adapt to room conditions, out of the packaging, for 24 hours before printing.

4. Handling

Be careful with the sheet's edges, since it's easy to accidentally bend them, which can cause crashes.

Wear gloves when handling the paper to avoid getting fingerprints and other marks on the surface.

5. Cleaning

If you notice any dust or debris on the surface of the first sheet of the stack, wipe it with a lint-free cloth before printing or discard it.

Preparing the job

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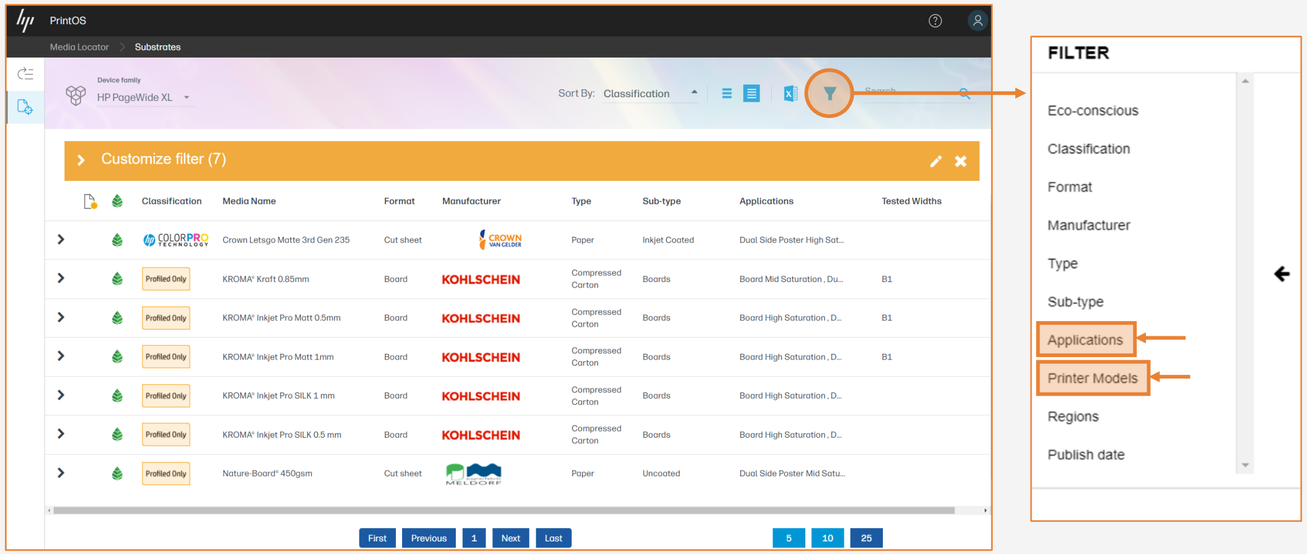
6. Substrate presets | Paper types

- Check if the material you are going to use has its own custom optimized substrate preset:
  a) On the printer's **front panel** online Paper Library search (tutorial)
  b) On the **web**, in the HP PrintOS Media Locator:
  On the Filter tab, select your Printer Model, then select "**Application: Packaging**".
  c) On the **web**, from the substrate vendor's or RIP vendor's websites
- Download and install.

Select a suitable substrate preset based on your media

NOTE: If you cannot find custom substrate presets for your material of choice, you can always use the **generic presets** already installed in your printer:

- For paperboards with an inkjet treatment, try using a **WaterBased Coated Paper** generic preset.
- For uncoated paperboards try using a **Plain/Uncoated Paper** generic preset.



Preparing the job

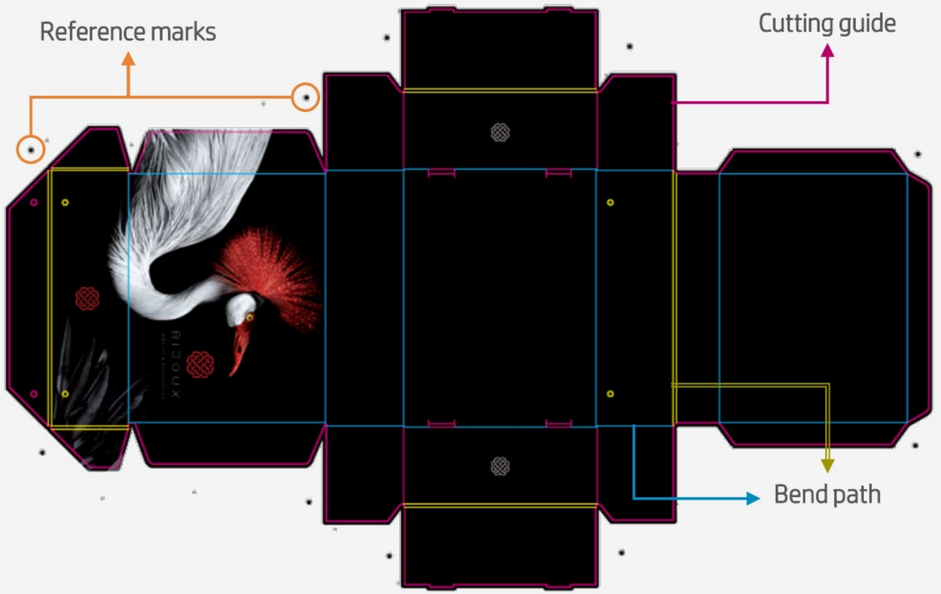
7. Create the file

Design the content and structure of the box using tools such as Adobe Illustrator, Photoshop, or any other program that will allow for export to a vector format.
You can also use a 3D modeling program or plugin to help you visualize how the final product will look.

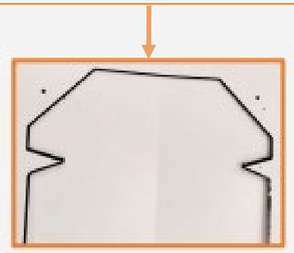
8. Job edition

One of the key editing attributes when designing packaging is the **cutting** and **creasing path** definition.

1. Draw the cutting path: it should follow the graphic's silhouette interior, leaving 3mm bleed margin. It should also include all necessary holes and grooves needed for assembly.
2. Create a new color swatch and assign it to the cutting path, saving it to its own unique layer.
3. Draw the soft creasing bend path. It should follow all box edges that need to be folded for the final assembly.
4. Create a new color swatch and assign it to the bending path, saving it to its own unique layer.
5. Add registration marks for your digital cutting table and save them to all layers.



TIP: Leave **3mm bleed margin** between the printing image edge and the cutting path to ensure there will not be any unprinted surfaces in the final product.

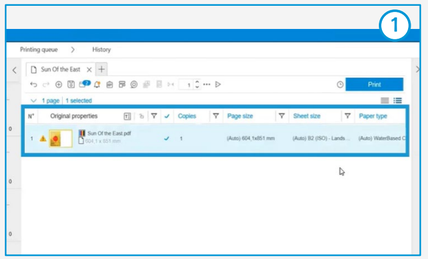


TIP: When designing boxes that need to be folded **180º**, draw **two parallel crease lines** instead of one to avoid cracks during assembly. Parallel lines should have 2-3mm separation.

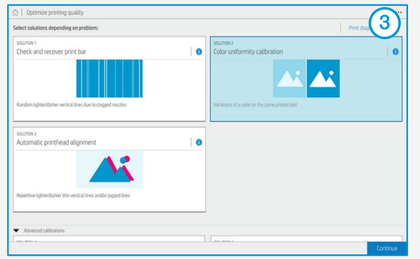
The printing process

Loading a sheet | Manual Load

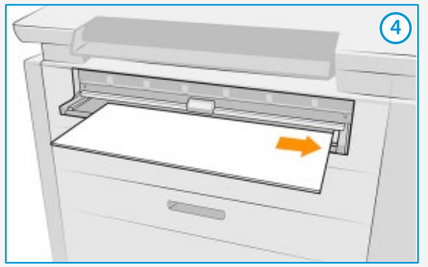
1. Load your printing file into **HP SmartStream** or other third-party compatible RIPs, like Onyx or Caldera.



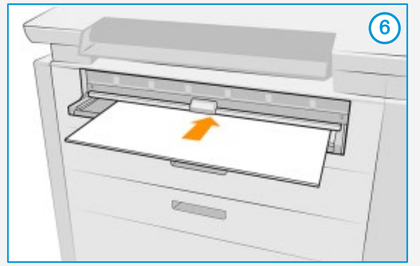
2. On HP SmartStream, select the **Sheet view** icon on the toolbar, then choose the parameters such as paper type, thickness, size, print quality, or double-side settings.



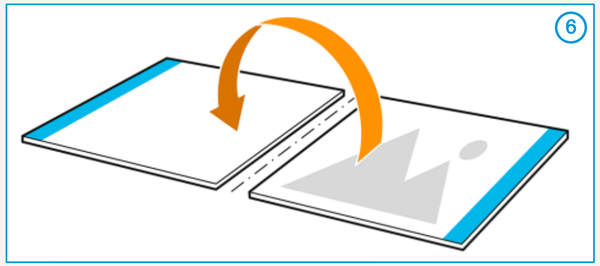
3. If it's your first time using this substrate, perform a basic **Color Uniformity Calibration** and **Automatic Printhead Alignment** before printing. You can follow this Calibration guide.



4. Click **Print** and follow the instructions of the Front Panel. First open the input tray, then load the sheets **aligning its edge with the right side of the printer**.



5. Load the next sheets one by one when the Front Panel prompts you to do so.



6. If printing a **double-side job**, wait for the Front Panel prompt to flip the printed sheet(s) vertically, align them to the right, and load them to print side B.

TIP: Check this short video guide if you have any doubts about the manual loading process. If using an **HP Sheet Feeder** accessory, check this video guide on how to automatically load stacks of sheets.

NOTE: Learn how to boost your workflow efficiency using HP SmartStream by enrolling on the available training: "Advanced certification - PWXLPRO5200and8200" on HP Learn.

Post-print finishing

1. Laminating (optional)

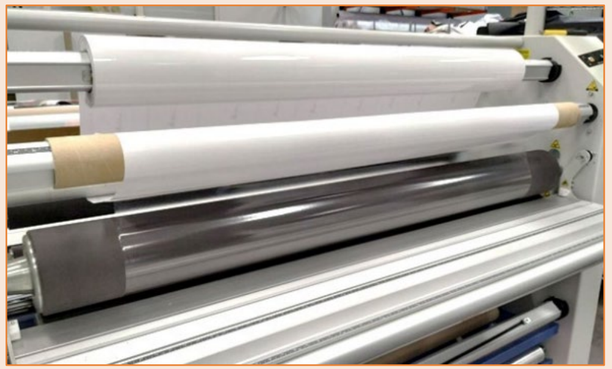
Laminating the printed boards will make your boxes more resistant to scratches and liquids while also giving them a more premium look.

We recommend using a glossy thin film as a laminate for the best results (~32 µm/ 0.0013 in). Select the appropriate lamination temperature depending on the film in use (usually 120ºC for hot lamination, or 25ºC for cold lamination).

If you are unsure about which lamination settings to use, contact your laminate manufacturer.

Packaging samples printed on a HP PageWideXL Pro 8200 & laminated using the following equipment:

- **Laminate:** 3M Scotchcal 8518
- **Laminator:** Seal 65 PRO MD
- **Temperature:** Cold laminated (25ºC)
- **Substrate:** Kohlschein Inkjet Pro Matt



NOTE: If using particularly thick sheets, lamination may be required to avoid cracking the surface during assembly. This is usually not necessary if using the right substrate with the right creasing parameters.

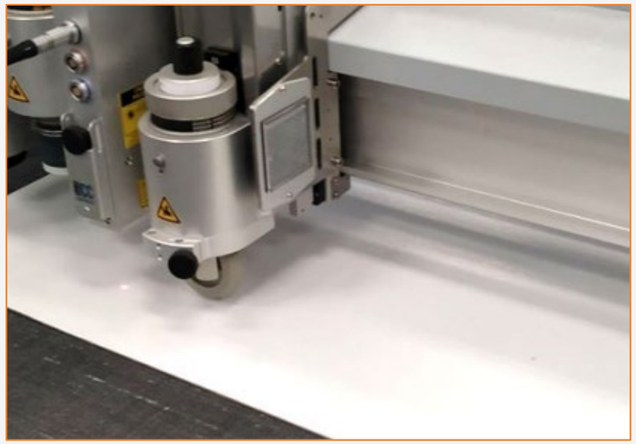
Post-print finishing

2. Creasing

A. Digital cutting table:

1. Import the cutting and creasing path created in previous steps into the flatbed cutter.
2. Assign the material, settings, and tools to the operation. Choose a **creasing wheel** tool type designed for folding carton that matches the grammage of your material.
3. Place the printed paperboard on the flatbed table with **the outer face facing upwards**.
4. Turn on the vacuum and give the paperboard a small push. If it moves, increase the vacuum power.
5. Use the registration marks on your printed design to align the machine.
6. Run the creasing operation, preferably on best quality mode.

IMPORTANT: Make sure the groove is made on the **outer side** of the box. Otherwise, cracks will form during assembly.



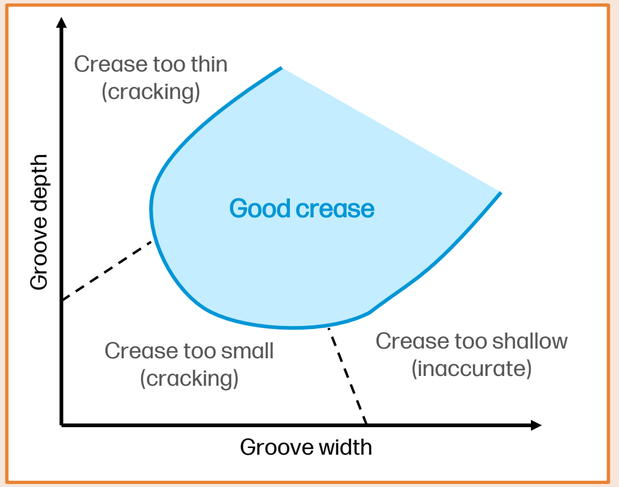
TIP: If your cutting table can operate with multiple tool modules, merge the cutting and creasing steps into a single operation to maximize job efficiency.

Post-print finishing

2. Creasing

A. Digital flatbed cutter:

Creasing wheel tool



A **good crease** is a result of the right combination of **depth** and **width** of the groove created by the wheel.

These can be adjusted by **changing the pressure** and **depth parameters** of the digital flatbed, and by **changing the wheel tool**.

A **4pt. width / 1mm depth** wheel is commonly used with 250-400gsm paperboards.

TIP: If your flatbed can operate with multiple tool modules, merge the cutting and creasing steps into a single operation to maximize job efficiency.

B. Manual creasing:

Use a **manual creasing tool** (also known as a **bone folder**) and straight edge ruler to crease your material. Use the creasing path reference in your design as guidance.
Use the sharp end of the tool to create deeper grooves and use the edge to create shallower grooves.

Post-print finishing

3. Cutting

A. Digital flatbed cutter:

1. After the creasing operation is finished, assign the material, settings, tool module, and blade to the cutting operation. Use a sharp light duty **EOT Electric Oscillating Tool** (or similar) with a blade that matches the characteristics of your material.
2. Turn on the vacuum and give a small push to the paperboard to test if it's firmly set in place.
3. Use the registration marks on your printed design to align the machine.
4. Run the cutting operation, preferably on best quality mode.

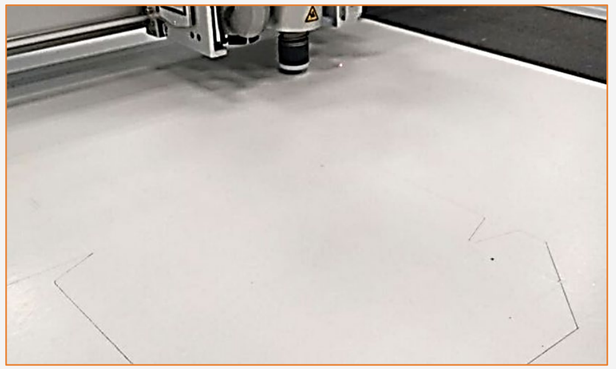
TIP: Calibrate the right cutting depth parameter for your flatbed cutter

Example of proper cutting depth

Example of too deep cutting depth

EOT tool

TIP: If printing a double-sided design, run the cutting operation on side B. This will give a cleaner finish to the front-facing face.



Post-print finishing

B. Manual cutting: Use a sharp **utility knife**, a straight edge ruler and a cutting mat to cut the outer perimeter and all the grooves needed for assembly. Use the cutting path reference in your design as guidance.

4. Assembly

Build the box using the bend paths that have been creased in previous steps. Be especially careful with 180º folds, make sure not to skip any of the parallel bend paths.

Some boxes are designed with flaps that securely tuck in place during assembly without the need of adhesive, while others may need glue to be built.

NOTE: Samples printed on a PageWideXL Pro 8200. Substrate used: Kohlschein Inkjet Pro Matt 0.5mm.