How to print on PVC foam board
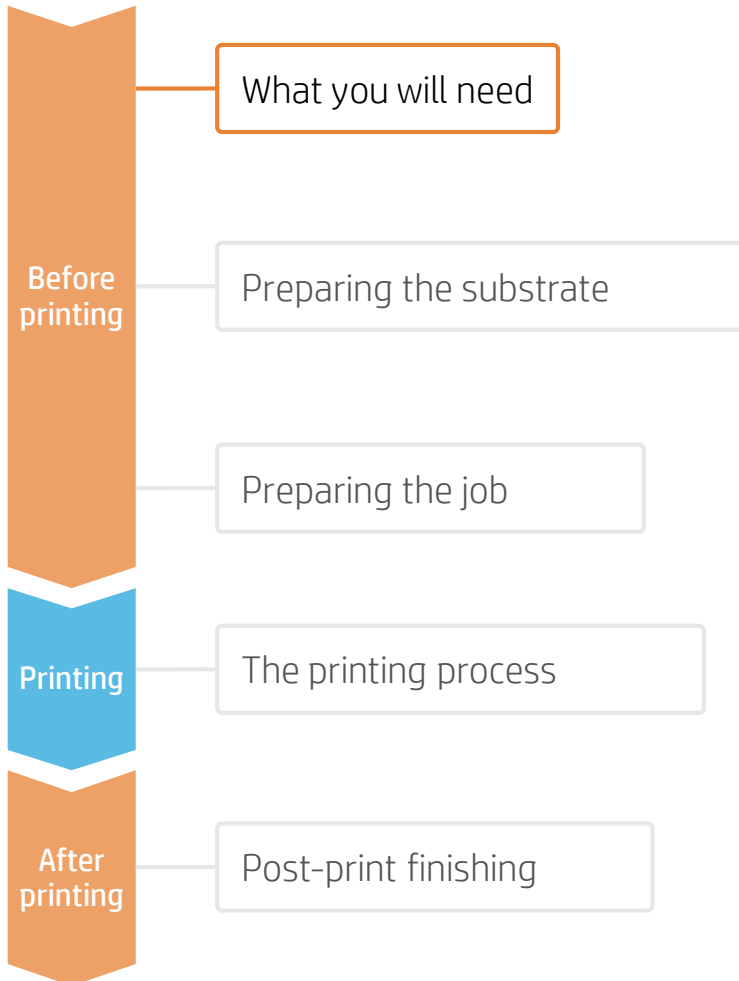
This document will explain how to print on PVC foam board, both white and colored.

How to print on PVC foam board
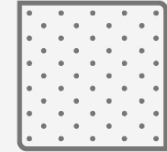
What you will need

```
┌─ Before printing ─┐
│  What you will need  │ ← (highlighted)
│  Preparing the substrate  │
│  Preparing the job  │
├─ Printing ─┤
│  The printing process  │
├─ After printing ─┤
│  Post-print finishing  │
```
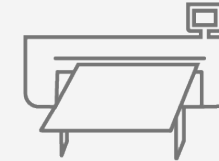
PVC foam board

Cutting device

Clean cloth

SW tools (RIP, edition, etc.)

Printer
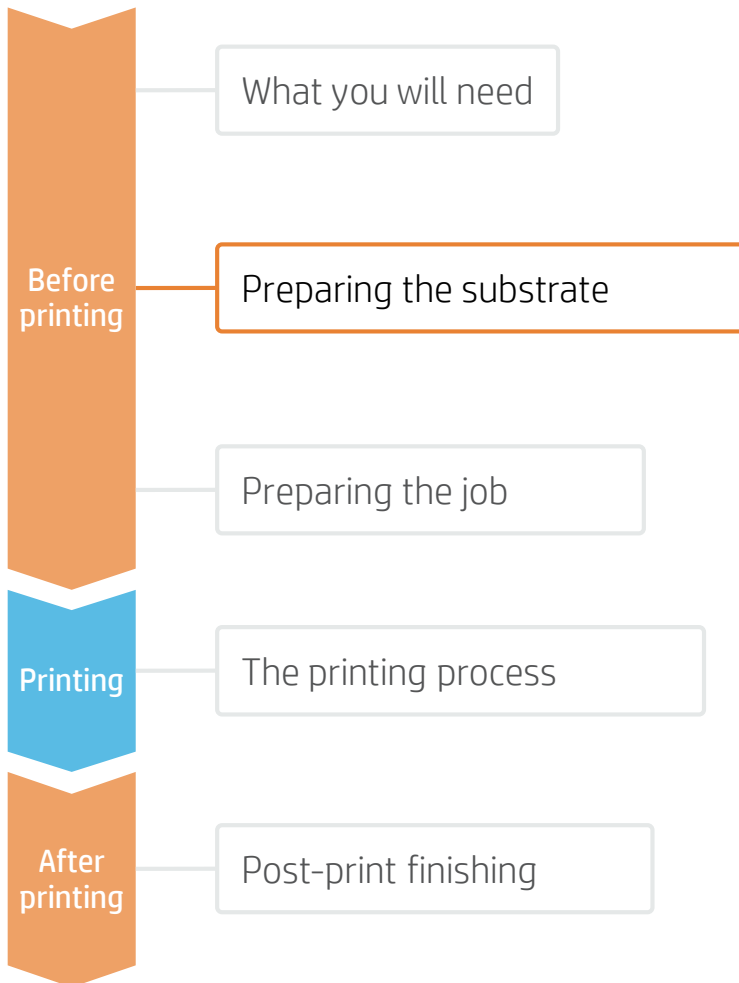
Isopropyl alcohol *(optional)*

Gloves

Drill and metal drill bits *(optional)*

Finishing parts: screws, washers, etc.

How to print on PVC foam board

Preparing the substrate

Before printing
- What you will need
- **Preparing the substrate**

Printing
- Preparing the job
- The printing process

After printing
- Post-print finishing

1. Substrate storage

Store the boards horizontally in a clean, cool, dust free environment.

2. Substrate handling

Handle substrates with care!
It is recommended to use gloves when handling boards to avoid fingerprints. Some foam boards may have smooth and soft surfaces that can be easily scratched or damaged. Scratches created prior to print will be also visible after printing.

3. Substrate cutting

Cut the sample to the desired size using a cutting device (table saw, cutting table, etc.).

📝 NOTE: This process can also be completed after printing **the job**.

4. Peel protective film

If the substrate has a protective film, peel it off from one side, leaving the other side protected until finishing or installation of the sign.
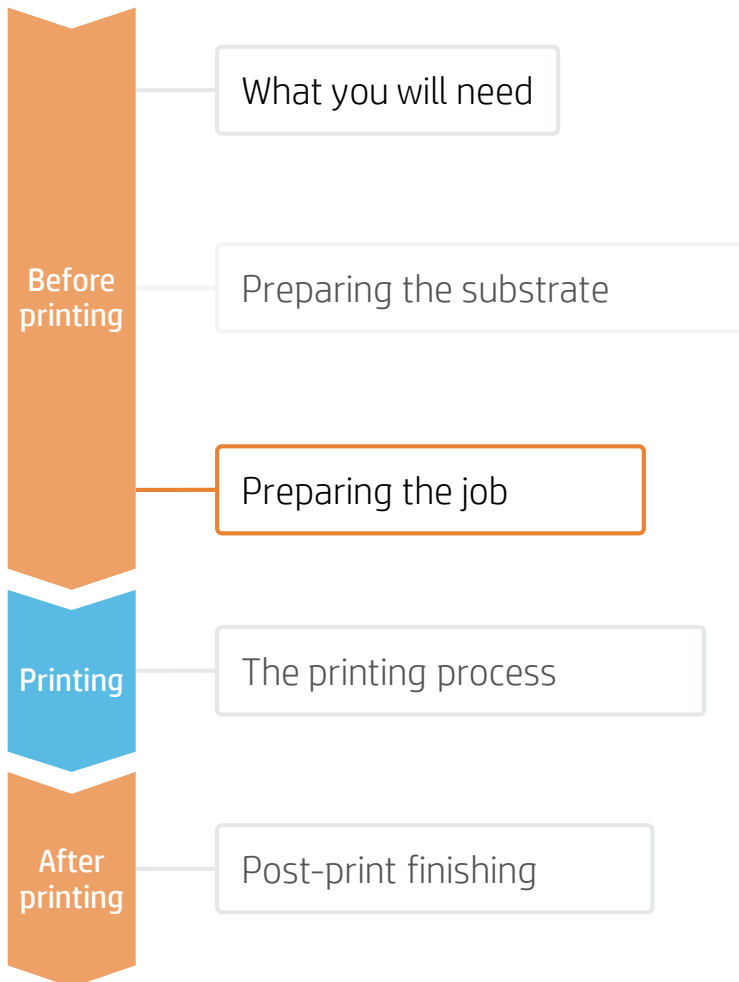
5. Sheet cleaning

After removing the protective film, dust particles may tend to adhere to the print surface. Remove the dust particles by wiping the surface with an anti-static cloth.

💡 TIP: If an anti-static cloth is not available, use a 90% isopropyl alcohol/10% water solution on a lint-free cloth and wipe the print surface. Let it dry before printing.

How to print on PVC foam board

Preparing the job

Before printing
- What you will need
- Preparing the substrate
- **Preparing the job**

Printing
- The printing process

After printing
- Post-print finishing

Depending on the job and the PVC foam board being used, decide:

White (underflood or spot) mode on a black board

Color mode on a white board

💡 TIP: Using the white underflood print mode offers good color accuracy on non-white panels. The white spot mode allows the printing of white images on non-white panels. Use color mode to print on white PVC foam boards.

📝 NOTE: To **work with white**, please refer to the cookbook *How to print with white*. (2 RIPs: ONYX and Caldera.)
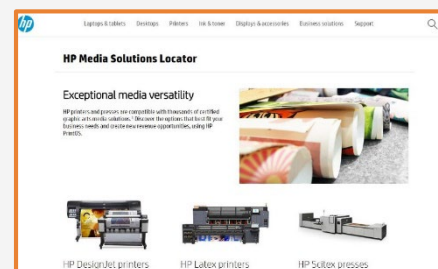
PVC foam boards media presets

Many PVC foam board substrates have been tested by HP. In some cases, a media preset may have been created and be available for downloading. Visit: https://www.printos.com/ml/#/homeMediaLocator

HP recommends downloading and installing it on your printer and RIP.

If there is no specific media preset available for the substrate being used, using the "**Generic PVC Foam**" media preset may be a good starting option.

How to print on PVC foam board

The printing process

Before printing
- What you will need
- Preparing the substrate
- Preparing the job

Printing
- The printing process

After printing
- Post-print finishing

1. Rip the artwork selecting the right media preset and print mode for PVC foam and send the output to the printer's queue.

2. Load the substrate on the printer as **Foam_PVC > Generic PVC Foam** (or using the specific media preset).

3. Follow the loading process.

4. If you need to use a heat sensitive (HS) print mode, activate the curing lever.

5. Select the *RIPped* substrate and drag it to the printer queue.
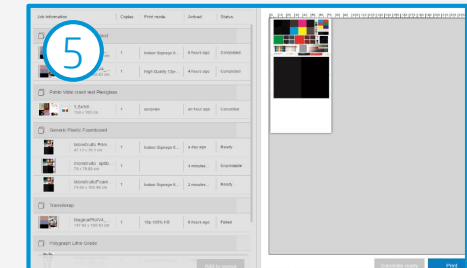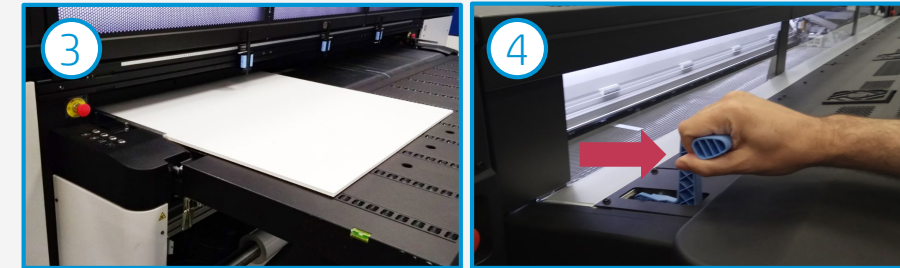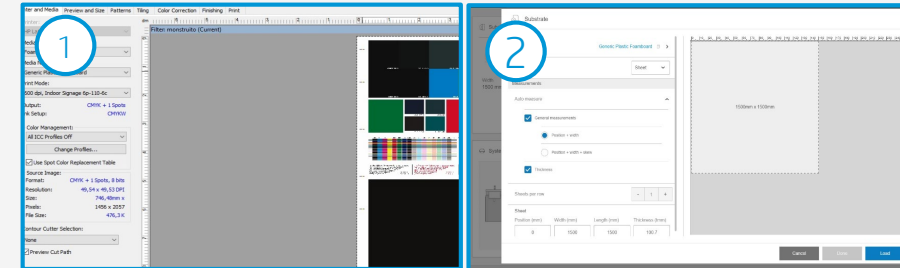
📝 NOTE:
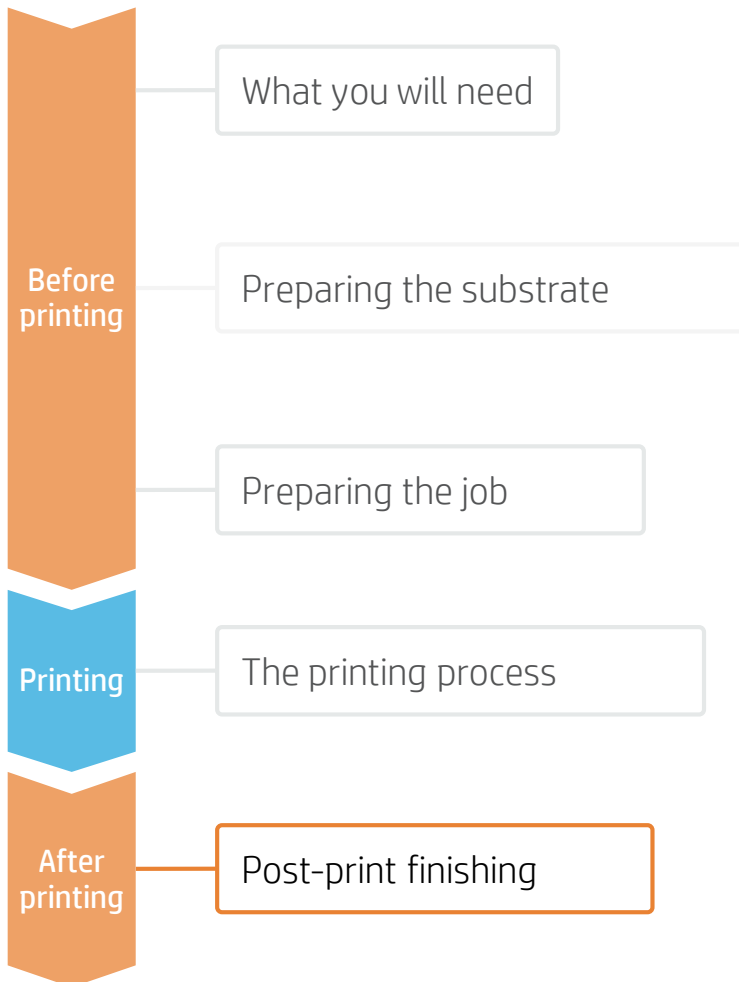
Regarding the print mode selection:

- Select the **color** modes "Fast/Outdoor signage/Indoor signage" to print on white boards with thickness **equal or greater than 3 mm.**

- Select "**White UF**" mode to print on non-white boards when you need to achieve realistic colors. In this mode, a white ink layer is printed first and a color layer is printed on top of it.

- Select "**White SP**" mode to print on non-white boards for images where white is not mixed with other colors in the same area.

- Select the **heat sensitive** modes "**Fast HS/Heat Sensitive**" to print on boards **thinner than 3 mm.** These modes apply a smoother temperature ramp that helps keep the boards flat.

Press print

Once printed, what else?

Before printing
- What you will need
- Preparing the substrate
- Preparing the job

Printing
- The printing process

After printing
- Post-print finishing

1. Substrate handling

Output straight from the printer may exhibit a slight waviness. In most cases, allowing the output to sit on a flat surface for 5-10 min, it will recover the original shape. If deformation is unacceptable after 10 min, consider reducing the curing temperature and print again.

📝 NOTE: Reducing the curing temperature may require decreasing the ink amount and/or using a slower print mode.

2. Cutting

Cut the sample to the final dimensions, if you have not done it previously.

💡 TIP: It is possible to cut the samples right after printing. There is a small risk of ink chipping during the cutting process.

📝 NOTE: HP has successfully cut different PVC foam boards on a Zünd XL3200 table cutter using the following settings:
- **Sheets up to 4 mm:** UCT Head / Z10 Blade / Cutting speed: 800 mm/s
- **Sheets up to 5 mm:** EOT Head / Z21 Knife / Cutting Speed: 100 mm/s
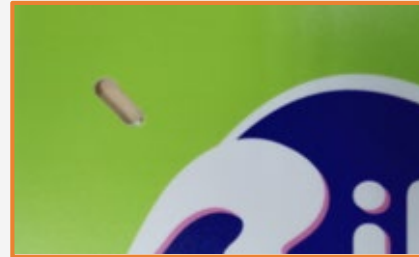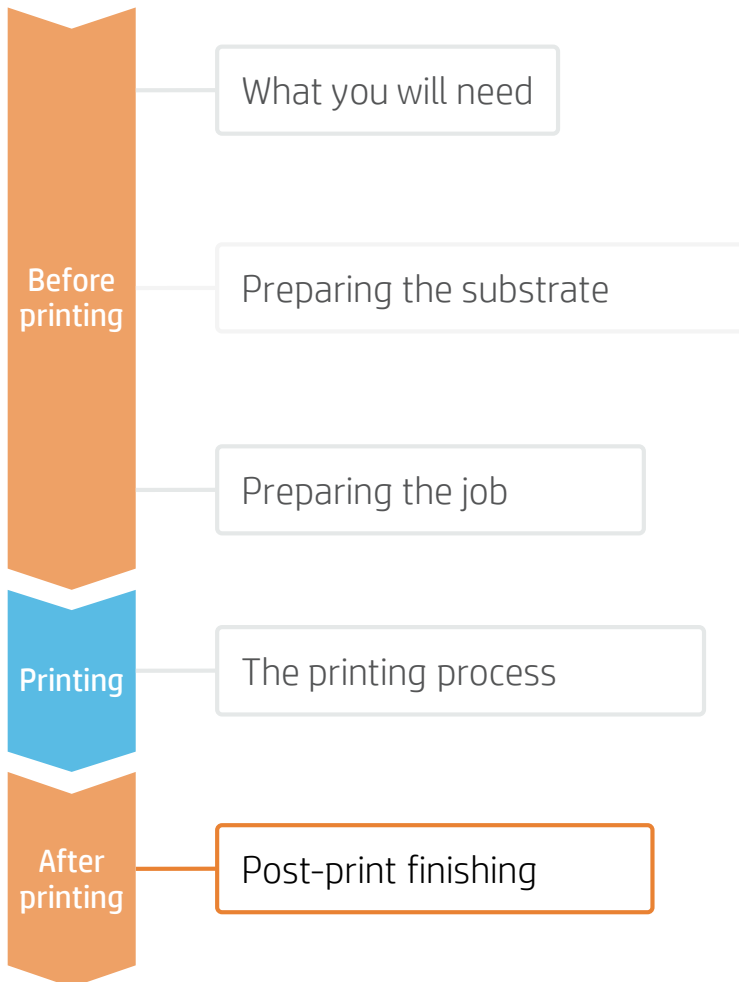- **Sheets thicker than 5 mm:** POT Head / Z61 Knife / Cutting speed: 100 mm/s

3. Substrate placement

Most PVC foam boards can be used in environments with temperatures up to 60ºC /140ºF. At higher temperatures, the board may soften and deform. Dark colors are not recommended for outdoor use because they absorb heat energy. If exposed to direct sunlight, white foam may heat to temperatures of 10-20ºC/50-70ºF higher than air temperature. PVC foam is more brittle in colder temperatures.

How to print on PVC foam board

Steps after printing

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


4. Substrate expansion

PVC foam boards expand and contract with temperature changes. When installing PVC foam panels, it is very important to consider the substrate expansion to avoid cracking of the boards. Drill oversized holes to allow boards to absorb expansion.

📝 **EXAMPLE:** A **2 meter sign** is printed and cut on a **sign shop where temperature is 20ºC.** The sign will be placed outdoors. **The maximum temperature we can expect after installation is 35ºC and the minimum is 10ºC.**

- **Substrate expansion:** 0.07 x sign size (m) x (max. expected temp. – temp. at cut)
- **Substrate contraction:** 0.07 x sign size (m) x (temp. at cut – min. expected temp.)

- **Substrate expansion:** 0.07 x 2 x (35-20) = 2.1 mm
- **Substrate contraction:** 0.07 x 2 x (20-10) = 1.4 mm

📝 **EXAMPLE:** A **48 inches sign** is printed and cut on a **sign shop where temperature is 68ºF.** The sign will be placed outdoors. **The maximum temperature we can expect after installation is 95ºF and the minimum is 50ºF.**

- **Substrate Expansion:** 0.00004 x sign size (in) x (max. expected temp. – temp at cut)
- **Substrate Contraction:** 0.00004 x sign size (in) x (temp. at cut – min. expected temp.)

- **Substrate Expansion:** 0.00004 x 48 x (95-68) = 0.05 in
- **Substrate Contraction:** 0.00004 x 48 x (68-50) = 0.035 in
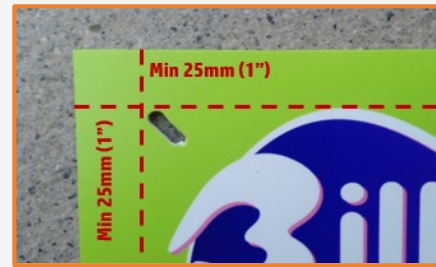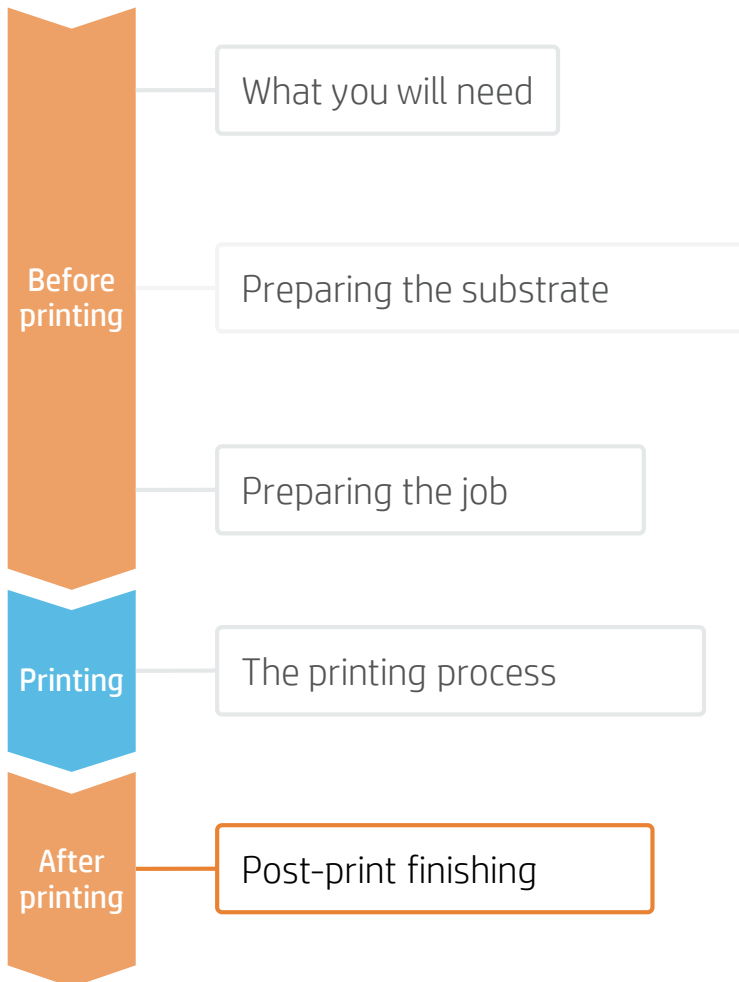

5. Drilling

Most PVC boards can be drilled with carbide-tipped bits using twist drills recommended for metals. Recommended bits are:

- Point angle: between 90 - 110
- Spiral angle: 30

How to print on PVC foam board

Steps after printing

Before printing
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6. Screwing and Nailing recommendations

Any type of screw or nail can be used to fasten PVC boards.

Depending on the board thickness, the following guideline is offered as a recommendation for distances between fastening points.

Sheet thickness	Distance between fastening points (d)
2 mm (0.08 in)	150-200 mm (6-8 in)
3 mm (0.12 in)	300-400 mm (12-16 in)
4 mm (0.16 in)	500-700 mm (20-28 in)
5 mm (0.2 in)	800-1100 mm (31-43 in)
6 mm (0.24 in)	1200-1800 mm (47-70 in)

EXAMPLE: A **1000 x 1500 mm (39 in x 59 in) sign (w x h)** is printed on a **3 mm** board and a calculation needs to be done for the number of fastening points. In this instance, the decision is made to avoid media bending as much as possible:

- **Number of fastening points (w):** 1000 mm/300 mm = 3.33 → 4 (rounded up)
- **Number of fastening points (h):** 1500 mm/300 mm = 5

- **Number of fastening points (w):** 39 in/12 in = 3.25 → 4 (rounded up)
- **Number of fastening points (h):** 59 in/12 in = 4.9 → 5

Drill holes leaving a margin of 25 mm (1 in) from the sign edge.

The diameter of the hole or length of the slot should not be less than 2.5 times the shank diameter of the fastener. Use washers to spread the compression load when bolts are tightened. The screws should be tightened only firmly enough to allow the sheet to expand and contract in all directions without warping or buckling.

Learn more at:

hplatexknowledgecenter.com

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