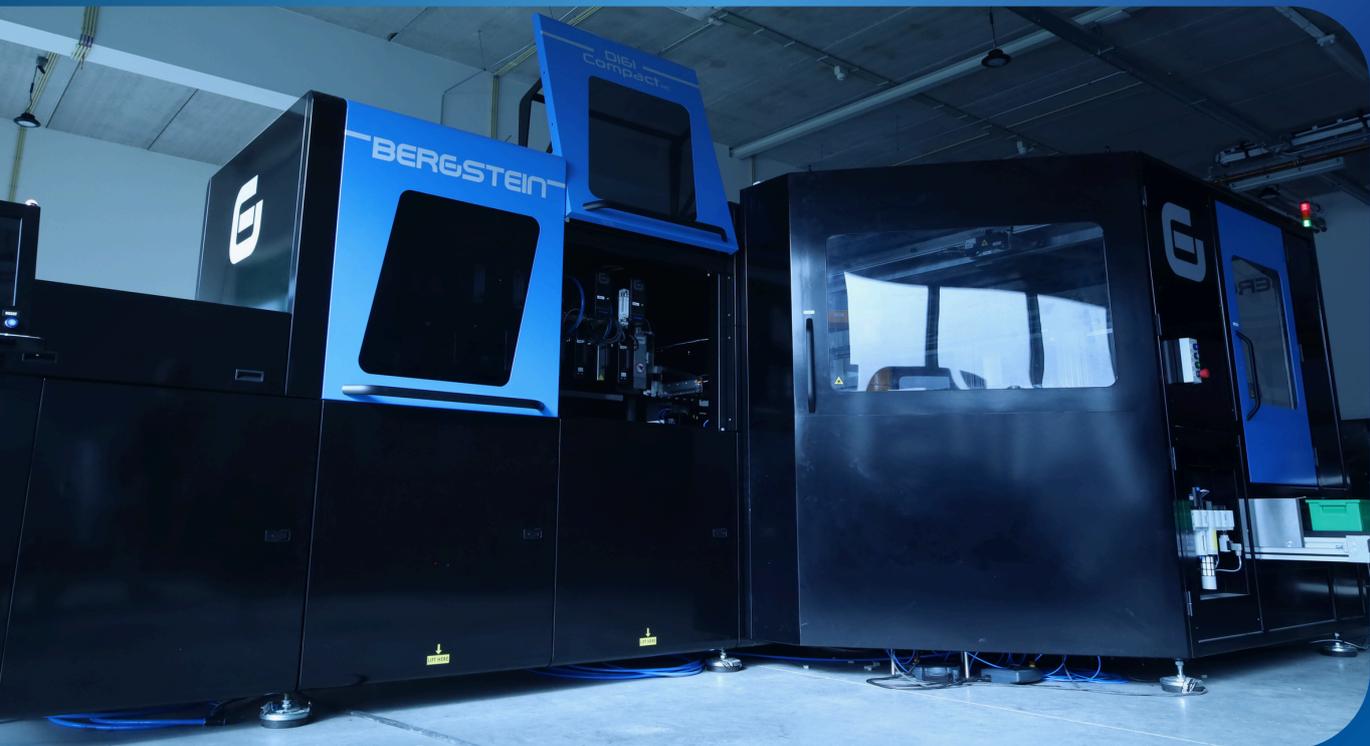


Pad printing vs Digital printing 2026





Why Single-Pass Digital Printing Is Redefining the Future of Direct-to-Shape Production

Fifteen years ago, at Bergstein Digital B.V., we started with a simple yet ambitious question: *“Can direct-to-shape printing be smarter, faster, and more flexible?”*



At that time, pad printing was the industry standard, a trusted technology known for its precision on small batches and straightforward designs. But as markets evolved and personalization became the new norm, expectations shifted. Manufacturers began asking for **more designs, more colors, and shorter lead times** all without compromising on quality.

And that's where our journey began.

Through years of research, testing, and continuous innovation, we developed our single-pass digital printers, machines that do not just print directly onto objects, but break through the limitations of traditional methods.

Today, we can confidently say that digital printing is a **future-proof, time- and cost-saving** alternative to pad printing and its advantages are proven every day on production floors worldwide.

When pad printing still fits

There are scenarios where pad printing remains a solid choice; for instance, **low volumes, simple designs, or limited color requirements**. In those cases, traditional printing can still be efficient and cost-effective.



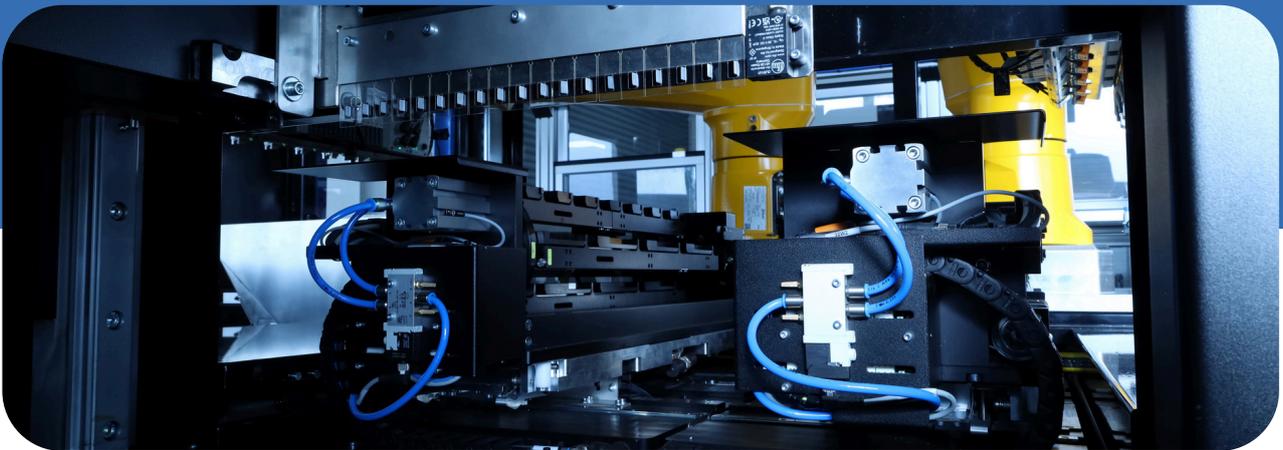
But when speed and flexibility matter...

That is where digital printing shines. With single-pass technology, you can:

- Switch designs instantly, without clichés, plates, or cleanup time.
- Scale production and speed in seconds without additional setup costs.
- Control every step digitally, minimizing errors and maximizing flexibility.

In this whitepaper, we will share the insights and lessons we have gathered over more than **15 years of experience** explaining why single-pass digital printing is not just an alternative to pad printing, but a decisive step forward for modern production.

Printing on Demand: Efficiency Meets Flexibility



Digital printing

Imagine a production line that prints exactly what you need. No more, no less. With digital printing, every product is printed on demand, perfectly matching daily or weekly production volumes. There is no overproduction, no obsolete stock, and no wasted materials.

By printing only what is required, you eliminate the need for large storage spaces filled with pre-printed items that might never be sold. It's a lean, agile way of working that aligns perfectly with today's fast-changing markets.

Pad Printing

Traditional pad printing, on the other hand, often relies on printing in bulk. Because setup and changeover take time and money, manufacturers tend to produce large batches to justify the effort. While that approach once made sense, it can lead to stockpiles of printed products that become outdated before they ever reach the customer.



Product Personalization: Power in every customization

Personalisation of products

On today's production lines, flexibility is everything. With digital printing, every item can carry its own name, barcode, or design automatically, and without stopping production. No manual changes, no interruptions, just continuous, efficient printing at full speed.

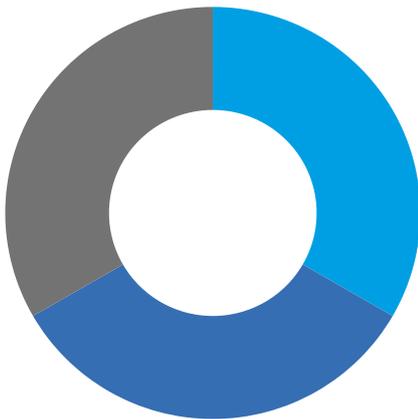
Personalization is no longer a luxury; it is an expectation. Whether you are producing branded tools, medical components, or consumer goods, customers want individuality and manufacturers need flexibility.

Feature	Digital Printing	Pad Printing
Personalised artwork per product	✓ Yes, every product unique	✗ No, fixed cliché per run
Changeover time	Seconds (file-based)	30–60 minutes
Production interruption	None (continuous printing)	Required for each change
Suitable for	On-demand, variable batches	Large, uniform batches



Product Personalization: Power in every customization

Digital printing



- Each individual product can be printed with unique variable data, logos, barcodes, or artwork without affecting the production flow.
- Design changes are implemented digitally in real time, eliminating the need for new clichés, plates, or manual setup.
- High-speed production accommodates full customization, enabling a seamless shift from batch printing to one-to-one personalization.

Pad printing

- Each design requires its own cliché, its own setup time, and often even dedicated inks or sizes.
- That means every change comes with downtime and added costs, making it impractical for short runs or one-off designs.

No Change-Over Times (Files or Colors)

Ready When You Are

Switching from one print job to the next should not feel like hitting the brakes. With digital printing, it does not. Need a new design or color setup? Just load a new file on your computer and you are good to go. Within seconds, the printer adapts and production continues: no cleaning, no color mixing, no downtime. It is fast, flexible, and built for a world where change happens all the time.

The Waiting Game

In pad printing, every new job means starting over. Each color change requires a new cliché, new ink, and a full recalibration. Depending on the complexity, it can take anywhere from thirty minutes to an hour before the next print even begins. While the digital printer is already finishing another batch, the pad printer is still warming up.



The True Cost of Printing Supplies

In industrial printing, the true cost of a print is rarely limited to ink alone. It is shaped by everything that surrounds the process: preparation, changeovers, cleaning, waste, and the consumables required to keep production running. When comparing traditional pad printing with single-pass digital printing, the difference in required supplies tells a powerful story.

Digital Printing: One Essential Supply

Digital printing fundamentally simplifies the production process. Once the printer is set up, the only consumable required during production is the ink that is actually printed on the product. Artwork changes, logo variations, or variable data do not require physical intervention, only a new digital file.

Pad Printing: A Chain of Consumables

Pad printing, by contrast, relies on a sequence of physical components and chemical supplies. Every change in artwork or color triggers a cascade of consumable usage: new clichés must be produced, pads may need to be exchanged, inks are mixed, solvents are added, and extensive cleaning is required before production can restart.

100%

There are no clichés to manufacture, no pads to replace, and no solvents or cleaning fluids needed between jobs. As a result, nearly **100% of the consumables used in digital printing directly contribute to the final product.**

▲ 77%

- Up to 77% higher cost efficiency per printed product
- More value from every print, with fewer materials and lower indirect costs.

▼ 85%

- Up 85% fewer consumables compared to pad printing
- Minimal waste, since ink is only used where it is jetted
- No indirect supply costs related to setup or changeovers

Efficiency at any scale

Efficient at Any Volume

Digital printing is designed to perform efficiently, regardless of batch size. Small series and large production runs are handled with the same ease, without additional setup effort or extra labor.

Because the process is fully digital, production can start immediately and continue at a constant speed. This allows manufacturers to print exactly the required number of products per hour whether that is a limited batch or high-volume output, while maintaining a stable cost per product.

Dependent on High Volumes

Pad printing becomes cost-effective only when production volumes are sufficiently high. Extensive setup activities mean that small batches require disproportionate time and labor, making them inefficient to produce.

As a result, pad printing is primarily suited for long, repetitive runs. Low-volume jobs struggle to reach efficiency, while overall output per hour remains limited by manual handling and sequential printing steps.



Digital printing changes the economics of production by **removing the dependency on volume**. Whether producing small batches or high-volume runs, a digital printer operates with the same efficiency and minimal labor involvement.

No waste when changing files or colors

With **digital printing**, switching to a new file or color happens entirely in software. Once selected, the printer continues without interruption.

Changing a file or color in **pad printing** requires physical adjustments. Multiple test prints are needed to check color density and alignment, especially when printing several colors.

These setup steps consume time and materials, resulting in unavoidable product loss before stable production can begin.

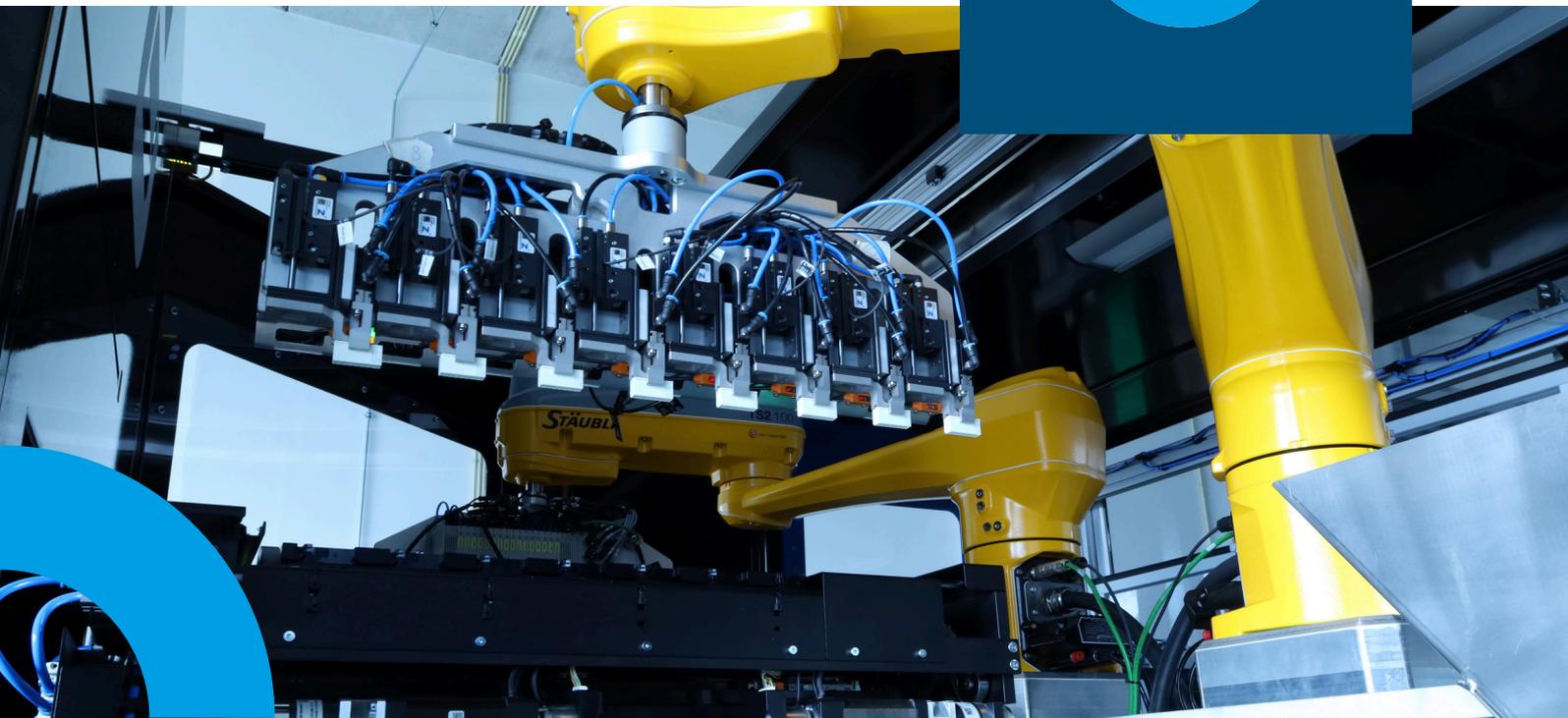
Reduction in setup-related waste



Lower indirect printing costs per change



Fewer rejected parts during changeovers



Instantly cured, ready to pack



UV-curable inks

Digital printing uses UV-curable inks that are dried and cured immediately using UV lamps inside the printing process. As soon as the product leaves the printer, the ink is fully cured.



No waiting time

There is no waiting time, no drying racks, and no risk of smudging or damage. Printed products can be handled, assembled, or packed directly after printing, enabling a continuous and efficient production flow.



Reduction in drying time

Up to 100% reduction in drying time
Products ready for packing immediately



Wet products

Pad printing typically uses solvent-based inks that dry through air exposure. After printing, products must remain untouched while the ink cures naturally.



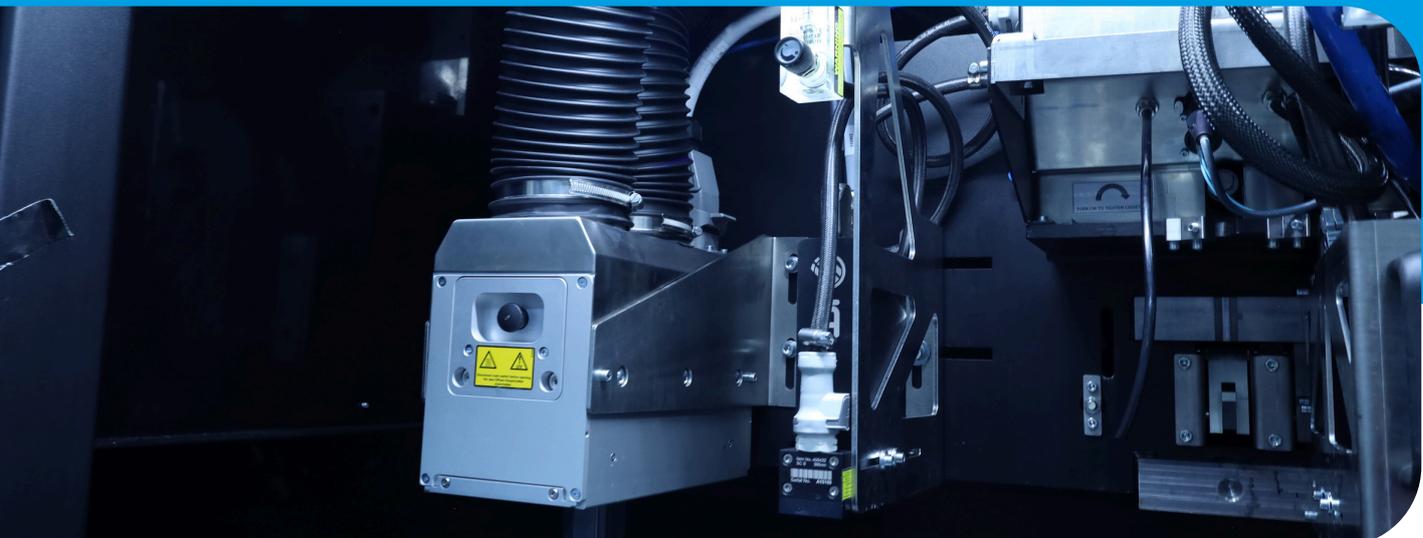
Long drying time

Depending on ink type, layer thickness, and environmental conditions, this drying process can take up to 24 hours before products are fully cured and ready for packing.



Wait for packing

Up to 24 hours curing time
before handling or packing



Constant print quality

Stable ink, consistent results

Digital printing uses a closed ink re-circulation system that continuously controls ink viscosity and temperature. This ensures that the ink properties remain stable throughout the entire production run.

As a result, print quality stays consistent from the first product to the last independent of run length, ambient conditions, or production time. No manual adjustments are required, and quality variations are virtually eliminated.

Quality Influenced by environment

In pad printing, ink behavior is strongly affected by external conditions such as temperature and humidity. Seasonal changes or fluctuations in the production environment can significantly influence viscosity and transfer behavior.

To maintain acceptable print quality, inks often need to be manually adjusted during production. These interventions increase setup time, introduce variability, and raise the risk of inconsistent or rejected prints.



Color Adjustment

Instant Color Control via Software

In digital printing, color adjustments are handled directly in the software. By fine-tuning digital parameters, colors can be made lighter or darker within seconds without stopping production or changing physical components.

This allows operators to react immediately and precisely, ensuring fast color accuracy and consistent results. Adjustments are repeatable, predictable, and do not generate waste or downtime.

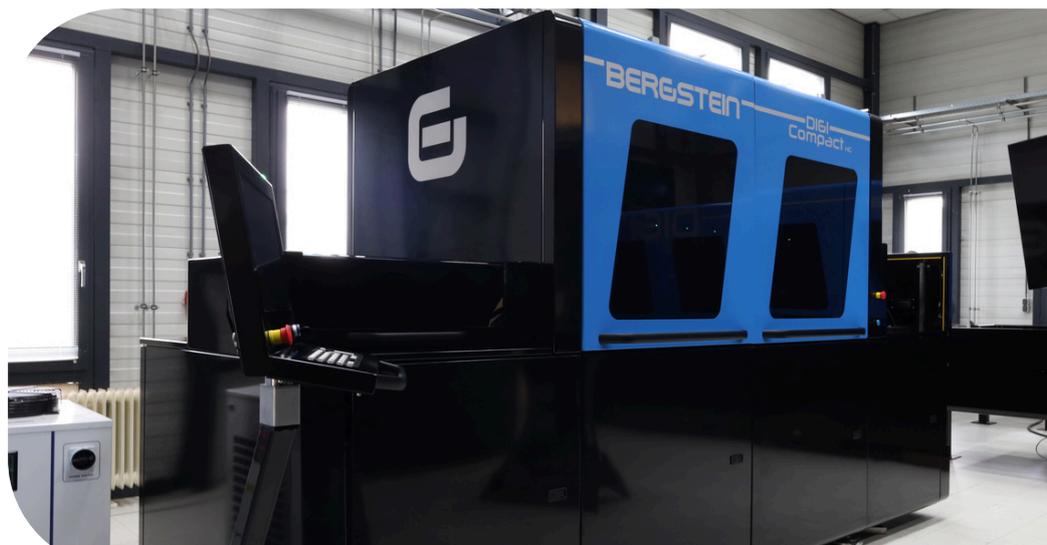
Up to 90–95% faster color adjustments
Color corrections completed in seconds

Manual and Time-Consuming Color Changes

In pad printing, correcting a color requires physical intervention. The ink must be removed from the machine, manually adjusted or remixed, and reinstalled before printing can resume.

This process often needs to be repeated several times before the desired color is achieved. Each iteration consumes time, materials, and test prints, increasing both cost and production delays.

Multiple adjustment cycles required
to reach correct color





Next steps

The transition from traditional printing methods to digital single-pass printing is not a one-size-fits-all decision. Each application, material, and production environment requires careful evaluation.

At Bergstein Digital, we support this process through print trials, feasibility testing, and tailored solution development ensuring that each digital printing system is aligned with real production requirements.

Phone

+31 (0)45 545 5051

Email

info@bergstein.com

Website

www.bergstein.com

Location

Wiebachstraat 6
6466 NG, Kerkrade
The Netherlands

