



Pad Printing Case Study

High-Speed Long-Cap Printing Fully-Integrated Flat-Bed and Rotary Printing

9,000 cycles/h +++ Precision printing +++ Efficient small-series production
+++ Saves on storage +++ Handles more orders/day

The Customer

MALA – The Experts for Aluminum Closures

MALA Verschlussysteme GmbH is a typical German “hidden hero”: A medium-size family business, yet still – or perhaps precisely for this reason – one of the biggest names in its sector and currently the world’s third-largest manufacturer of aluminum beverage closures. The company, located in Bad Liebenstein and Wernshausen in Thuringia, has been producing beverage closures since the beginning of the 1990s and is now THE undisputed specialist for aluminum roll-on closures.

In the meantime, they have expanded into the USA, serving the American market from their Petaluma site in California. With over 180 employees, MALA generates a turnover of 30 million euros. For some years now, the largest growth segment has been wine closures, produced as so-called Long Caps. Produced to the highest quality standards, the aluminum Long Cap’s classy look means it is now accepted and prized in the quality-wine sector which had long been fixated on natural cork.



Problem & Task

Inflexible and Expensive Production, Limited to Large Series

In the past, MALA had been producing aluminum Long Caps by printing very large, flat, unprocessed metal sheets using offset printing. Only when these sheets had been pre-printed, could the closures be punched and shaped. This method brought with it both technical problems as well as organizational and hence economic disadvantages:

- ☒ Production time was relatively long.
 - This led to extended reaction and delivery times.
- ☒ Production, in particular the drying process, was extremely energy-intensive.
 - Production was relatively expensive.
- ☒ Minimum production quantities per motif were very large.
 - It was not possible to handle the increasing number of requests for small and special series.
 - Not flexible enough to enable cheap post-production, for example, by subsequently increasing the order volume or with smaller follow-up orders.
- ☒ Pre-production for stock was always necessary.
 - Enormous space requirement and logistic expenditure for drying and storage.
 - Cost risk in the case of non-purchase.
- ☒ The offset method is not suitable for metallic colors such as gold, silver, or bronze.
 - High-grade looks could only be achieved to a limited extent.
- ☒ Punching and shaping of closures could only take place after printing.
 - Inaccuracies in punching and stretching of the print image during shaping/deep drawing considerably reduced print image quality.

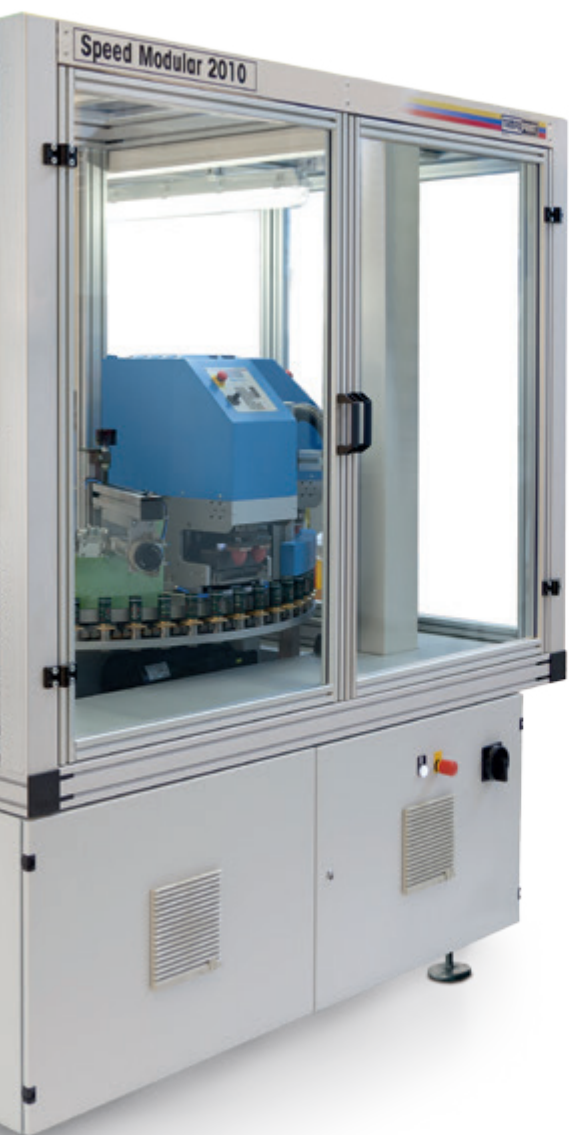


Printing Long Caps at High Speed

It works, it lasts and it pays off.

Thanks to TAMPOPRINT.





The Solution

Flat-Bed Printing at Rotary Speeds – The Speed Module

The task was to find a better alternative for high-quality and flexible printing. This is where pad printing came into it ...



The solution was realized in two phases:

Phase 1: Rotary Printing for 360° Printing of Circular Surfaces

The initial request was “only” for 360° circular printing of Long Caps after shaping (deep-drawing). This was realized by means of rotary pad printing. The two-lane TOP SPIN rotary pad printer prints 15,000 closures per hour – in four colors and with the highest precision, too.

Phase 2: Add-On High-Speed Flat-Screen Printing for Top Surfaces

Won over by the precision, speed, and stability of the circular printing process, the customer commissioned TAMPOPRINT with the development of a special module for also printing the top end of the closure. The challenge in this case was to develop a flat-bed printing machine which could keep pace with the production speed of the upstream rotary process. At that time, the maximum production by a clocked machine stood at 6,000 printed parts (cycles) per hour. The requirement this time, however, was 7,500. If you ask the TAMPOPRINT engineers today about taking up this stiff challenge, they reply unanimously: “Well, we just went and built it.” Today, the two interconnected machines run smoothly. The rotary pad printer transfers the printed Long Caps directly and without puffer storage to the SPEED module, where the overall process is completed by clocked printing of the top end. As a positive side effect, a new world record has been set, too. With its 9,000 cycles/hour, SPEED is the world’s fastest linear pad printing machine.

What is Pad Printing?

Pad printing is an indirect rotogravure printing method. Ink is applied to a plate that is engraved with the print image (the cliché). The excess ink is “scraped off” with a doctor blade or ring. As a result, the ink remains only in the engraved cavities that correspond to the image to be printed. Finally, this ink is picked up by a silicone rubber pad and transferred during printing. Since the pad is flexible, it is also possible to get great printing results on complex surfaces. The method was invented and perfected by TAMPOPRINT. Consequently, high-precision product printing at high speeds is now possible. In addition to inks, other substances can also be used for printing, if required.

The Benefits

Advantages for the Customer – Efficiency and Security

“Of course it’s fun setting records,” Head of Development, Stephan Berger, concludes. And board member Oliver Nitschke, himself an engineer, agrees: “The SPEED module is a world champion that works, lasts, and pays off.” He then adds, however: “As usual, the customer is primarily interested in the third part of our slogan. It had to pay off for him. And it did, too. In a big way.”

The advantages for the customer are indeed considerable:

- ☑ Flexibility:
The customer can now react quickly and flexibly to inquiries.
The minimum possible order volume was reduced to a fraction of what it was. This enables handling of smaller orders.
- ☑ Improvement in quality:
Print image quality was considerably improved, whereby truly high-quality looks can now be achieved. Metallic colors, such as gold, silver, and bronze, as required in the premium segment, are now printable for the first time. Registration errors (displacement of the print image), that were previously due to punching tolerances, are no longer an issue. And that with a process that is generally more robust and dust-tolerant.

- ☑ Energy saving:
The TAMPOPRINT process gets by without large drying systems and therefore requires considerably less energy.
- ☑ Personnel cost saving:
The process can now be run by fewer and less well-qualified personnel. Setup times, too, are much shorter.
- ☑ Elimination of cost risks:
No cost risk associated with pre-production for stock that might actually not be sold.
- ☑ Storage space and logistics expenditure savings:
A lot of space was saved that was previously required for drying and storage.

“In conclusion ...”

... according to Nitschke, “you could say that we revitalized what used to be quite a sluggish process. **We made a static production process totally flexible.** We raised quality to a much higher level. And last but not least, we noticeably **reduced overall production costs.** In a nutshell: Improved ergonomics, stability, and efficiency. And now it works, it lasts and it pays off ...”

Why can only TAMPOPRINT do this?

The key here is TAMPOPRINT’s unrivaled experience not only in machine construction and systems engineering but, above all, in process design. Experience that is backed up by customer orientation and determination, when struggling to develop the ideal solution. This combination puts market leader TAMPOPRINT several years ahead of its competitors. And the same goes for TAMPOPRINT’s customers as a result.

Key Facts at a Glance:

- ∅ Order flexibility
→ Small and medium-sized orders can now be handled.
- ∅ Production speed
→ Even with the flat-bed module, the system runs at the speed of a rotary printer.
- ∅ Cuts storage space
→ No necessity to stockpile
- ∅ Competitive edge
→ Low unit costs, small-series capability, print quality, and speed give the user a clear advantage in the market place.

Conclusion

Thanks to its **small-series capability**, low unit costs, **short setup times**, and excellent print quality at top speeds, the system is ideally suited to giving the customer a decisive lead over its competitors – and consequently a genuine **unique selling point**.

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ORIGINAL

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