A practical guide to improving your print efficiency

A new era
A greater need for print efficiency

Tighter print margins, faster turnarounds, rising ink and substrate costs, and the increase in hybrid flexo/digital systems, have all made pressroom efficiency, flexibility, and reliability critical.

The introduction of Fixed Color Palette (FCP) and Extended Color Gamut (ECG) printing have also fueled the need for greater print consistency and accuracy.

To help printers meet the challenges of tomorrow, tesa Efficiency Experts are helping to uncover the micro-inefficiencies that impair everyday efficiency.

Read on to learn how tackling these issues helps to unlock greater print output, predictability, and profitability.

One guide. A world of industry insight.

Written by a team of global experts, handpicked for their industry experience and flexo press knowledge, this guide covers the most common causes of pressroom inefficiency.

It also provides practical tips on how to reduce variability, improve print predictability, and lift speed, without compromising quality.

If you're serious about taking your print job to the next level, this booklet is the perfect place to start.

"Flexo printing was traditionally adapted to very long runs, where changeover was never an issue. But now, you have more and more changeovers on a regular basis. And that's why you need to optimize your print process."

Carsten Bastian
Global Key Account Manager
tesa

Ready to optimize your print productivity?

Unseen micro-inefficiencies at the plate mounting tape layer, such as the incorrect foam hardness, impression settings, or adhesive bond, can have a significant impact on your uptime, machine speed and pressroom efficiency.

“In a recent consultation, we found actual press uptime was below 40% – even though 60% was assumed. How much are hidden inefficiencies costing you?”

Carsten Bastian
Global Key Account Manager
tesa

Over the following pages, we’ll cover these micro-inefficiencies in more detail and show how they impact on three key print areas:

1. Your output

Profit margins are slim. The margin for error is tiny. How can you achieve faster changeovers, fewer breakdowns, less waste, more uptime, and greater productivity?

2. Your flexibility

Change is constant. Jumping from job to job, deadline to deadline, you need the right choice of solutions and expertise to remain agile.

3. Your print quality

There is little room for compromise. Your pressroom must deliver ever-higher standards, first time, every time.

Are common print issues reducing your output?

Your print output dictates everything from your operating costs and value per job, to your market competitiveness and ability to fulfil high-volume, fast turnaround projects at high speed. Here are some of the common questions our experts ask, when evaluating your output:

Optimum output checklist

- ☐ Are you able to run machines at higher speeds?
- ☐ Is press downtime a common occurrence?
- ☐ Does edge lift often interrupt your print runs?
- ☐ Are you struggling with frequent print defects?
- ☐ Is plate repositioning a regular part of the working day?
- ☐ Do you have issues with mounting and demounting plates?
- ☐ Is plate damage common?
- ☐ Can you confidently deliver first-time-right-print?

The biggest causes of output inefficiency

1. Printing defects due to plate or tape lifting
2. The wrong choice of tape hardness
3. Plate changeovers
4. Inefficient cleaning procedures
5. Old or deformed plates
6. Machine faults
7. Operator and shift variability
8. Process drift

“The most important factor is output, because it’s not only about machine uptime, it’s also about machine speed.

If you have a very long print job, 250,000 meters for instance, you can run this at 200 meters a minute, or you can do this with double or even triple speed. And therefore be much more efficient.”

Jürgen Dostal
Regional Key Account Manager
tesa

Common output inefficiency issues

Example #1: Plate edge lifting

What is plate edge lifting?

Edge lifting occurs when the edges of printing plates detach from the tape, either during mounting or during printing. This can create inconsistencies in print quality, affecting both production efficiency and results.

Impact:

1. **Print defects:** once the plate starts to lift, the edge of the plate starts printing and creates an unwanted printed area. If left untreated, the plate can actually come off and stick between the cylinders.
2. **Increased costs:** inefficient use of materials and resources increases operational costs and decreases profitability.
3. **Production delays:** correcting plate edge lifting issues causes delays and disruption.

Potential causes and solutions

Problem:
The back side of the plate is not sufficiently clean. Soap, oil, grease, and photopolymer residues reduce tape performance.

Solution:
Clean the plate thoroughly with a rag and clean solvent, dispensed from a spray or squeeze bottle. Wait until the solvent dries completely.

Problem:
Sufficient pressure has not been applied to the plates during mounting.

Solution:
Use a rubber roller or lay-on roller across the whole width of the sleeve/cylinder.

Problem:
Older, deformed plates tend to curl toward the image side.

Solution:
Store plates flat or curled to the PET side, and keep them in an air-conditioned room, with a separator placed between each plate.

Problem:
Wrinkling or creasing on the plate edge.

Solution:
Trim the plate edge to reduce the effect. Or use an adhesive promoter to increase adhesion.

Problem:
Burring on the edges of PET backing of the plate.

Solution:
Use deburring knives to take out these defects.

Problem:
Plate lift caused by a small repeat length of sleeve or cylinder when there is 100% coverage on the plate, fitted edge to edge with no gap.

Solution:
Use an adhesive promoter to increase the adhesion.

“The greatest source of inefficiency is machine downtime. So, if we can prevent this with the right choice of adhesive; one that is strong enough to hold down the plate edges, then the presses can keep running”

Jürgen Dostal
Regional Key Account Manager
tesa

For more information, download our flexographic printing troubleshooting guide.

Common output inefficiency issues

Example #2: Plate damage on demounting

What is plate damage on demounting?

A flexo photopolymer printing plate can be damaged if excessive force is used to remove it during the demounting process.

Impact:

Damaged plates can result in production disruption and additional costs for replacement plates. There is also the environmental cost to consider, due to plates going to waste and having to be replaced.

Potential causes and solutions

Problems:

Ink residues on the back side of the plate can act like an adhesive promoter, causing the bond between tape and plate to become too strong.

Solutions:

Manual plate cleaning

Cleaning the plates properly on the sleeves/ cylinders will limit ink contamination. Allow the cleaning solvent to dry before demounting. Afterwards, clean the back of the plate with a suitable solvent on the surface dedicated to cleaning.

Plate cleaning machines

With any plate cleaning machine, the back side of the plate will come into contact with the cleaning solvent during cleaning. After the machine cleans the plates, dry any excess solvent from the front and back sides of the plate first, then immediately clean with a suitable solvent to remove any ink residues.

Cleaning before mounting

Plate storage or handling plates during mounting can leave oil or dirt residue on the back side of the plates, which may increase or decrease adhesion to the plates. Clean the back side of the plate with a suitable ssolvent directly before mounting. Then, let it dry.

Problem:

Individual printer requirements, operating procedures, plates, and inks can all affect the performance of a tape's adhesive.

Solution:

Talk to our Efficiency Experts to find your ideal tape solution.

For more information, download our flexographic printing troubleshooting guide.

Are micro-variables reducing your flexibility?

Shorter runs, more SKUs, and endless personalization have created a need for faster print speeds, greater agility, and the flexibility to respond to customers' changing needs.

In an industry where choice is endless, but time is in short supply, flexo printers must be able to handle turnarounds quickly and efficiently, and maintain print quality, and consistency. Here are some of the common questions our experts ask, when evaluating your agility:

Optimum flexibility checklist

- ☐ Are changeovers slow and problematic?
- ☐ Is personalization difficult to deliver?
- ☐ Does an increase in print speed lead to print defects?
- ☐ Do shorter runs and more SKUs eat into your uptime?

The main causes of poor print flexibility

1. Product and material performance
2. Air bubbles
3. Plate mounting tape with the incorrect adhesive concept
4. Tapes with the wrong foam hardness
5. Slow plate changeovers
6. Poor tape removal techniques
7. Inadequate plate cleaning
8. Old or deformed plates
9. Machine faults
10. Operator errors

"Nowadays, you have 200 setups, instead of 20. So, it's essential to be able to execute fast, seamless changeovers. If that's not possible, it can have a real impact on customers' returns."

Carsten Bastian
Global Key Account Manager
tesa

Common print flexibility issues

Example #1: Air bubbles

What are air bubbles?

Air bubble formation refers to the presence of trapped air pockets between the plate and the tape, or between the tape and the sleeve during the flexographic printing process.

Impact:

1. **Print defects:** air bubbles accumulate in non-print areas and lift the plate in this area, which leaves marks.
2. **Material waste:** substrates with visible defects are often discarded, increasing material loss.
3. **Production delays:** demounting and realigning plates or adjusting parameters to correct issues causes unplanned downtime.

Potential causes and solutions

CYLINDER/TAPE

Problem:

High pressure on the mandrel can cause thin-walled sleeves to expand and therefore stretch the applied tape.

Solution:

When the sleeve returns to its original diameter, the tape might lift from the sleeve in some places. Keep air pressure on the mandrel within recommended levels and as low as possible. Use a tape that is more flexible and will therefore expand and contract with the sleeve if needed.

For more information, download our flexographic printing troubleshooting guide.

Problem:

Leftover solvents from cleaning agents used to clean the sleeve can evaporate under the tape.

Solution:

Give the sleeve sufficient time to dry before mounting the tape.

Problem:

Differences in temperature between the tape and sleeve/cylinder could cause trapped humidity.

Solution:

Make sure the tape and sleeve/cylinder are all at the same temperature before mounting.

TAPE/PLATE

Problem:

Too little mounting pressure leads to weak tape-to-plate bond, causing the plate to lift off.

Solution:

Apply steady, slow pressure with a rubber roller for manual mounting. On mounting machines, increase lay-on roller pressure and reduce sleeve speed if needed. Always inspect the sleeves for damage or low spots.

Problem:

The plate mounting tape has not been applied with enough pressure, thus creating a weaker bond.

Solution:

Apply tape with a squeegee to ensure sufficient pressure and better wetting properties compared to application by hand.

Problem:

When a plate needs to be repositioned during mounting and the adhesion to plate is higher than adhesion to sleeve, the plate might pull off the tape from the sleeve and leave an air pocket underneath.

Solution:

Make sure to use a plate mounting tape with adhesion levels matching your requirements, and be careful when repositioning plates.

Common print flexibility issues

Example #2: Foam delamination

What is foam delamination?

Foam delamination occurs when the tape is demounted from the sleeve or the plate, as the foam layer separates from the adhesive or leaves residue on the surface.

Impact:

1. **Increased downtime:** cleaning foam residue from cylinders and plates can be a labor-intensive process that delays production.
2. **Wear on cylinders and plates:** aggressive scraping to remove residue can damage surfaces and affect future print quality.
3. **Reduced mounting efficiency:** frequently replacing tapes due to delamination reduces overall productivity.
4. **Higher operating costs:** costs increase due to additional cleaning, potential purchase of specialized cleaning products, and replacement of damaged or low-quality tapes.

Potential causes and solutions

Problem:
Different sleeves have different surface characteristics and different surface energies, and they all react differently to pressure-sensitive adhesives.

Solution:
Make sure that the tape you use and the sleeve are suitable for each other, and that the sleeve's surface is not damaged.

Problem:
Pulling the tape off at the wrong angle can increase the risk of delamination.

Solution:
To avoid placing stress on the tape, try removing it at a shallower angle – e.g. 90° instead of 180°.

Problem:
Ink residues on the sleeve during tape mounting can react with the tape's adhesive and create a stronger bond.

Solution:
Always make sure to clean the sleeve with a suitable solvent before applying the tape.

Problem:
Long press runs, high impression settings, and long storage after printing can all increase the bond between the tape and the sleeve.

Solution:

If possible, it is good to demount the tape shortly after use.

For more information, download our flexographic printing troubleshooting guide.

What impact do hidden process issues have on your print quality?

When it comes to print quality there can be no compromises. Customers rarely accept anything less than 100%. However, at a time when the market expects higher standards, the challenge for printers is how to deliver, and maintain print job efficiency, and profitability. Here are some of the key questions our experts ask when evaluating your print quality:

Optimum quality checklist

- ☐ How often do you achieve a perfect register?
- ☐ Can you consistently guarantee the finest details in screens?
- ☐ Is “pinholing” a common occurrence on solids?
- ☐ Can you confidently deliver stable quality on long runs?

The main causes of poor print quality

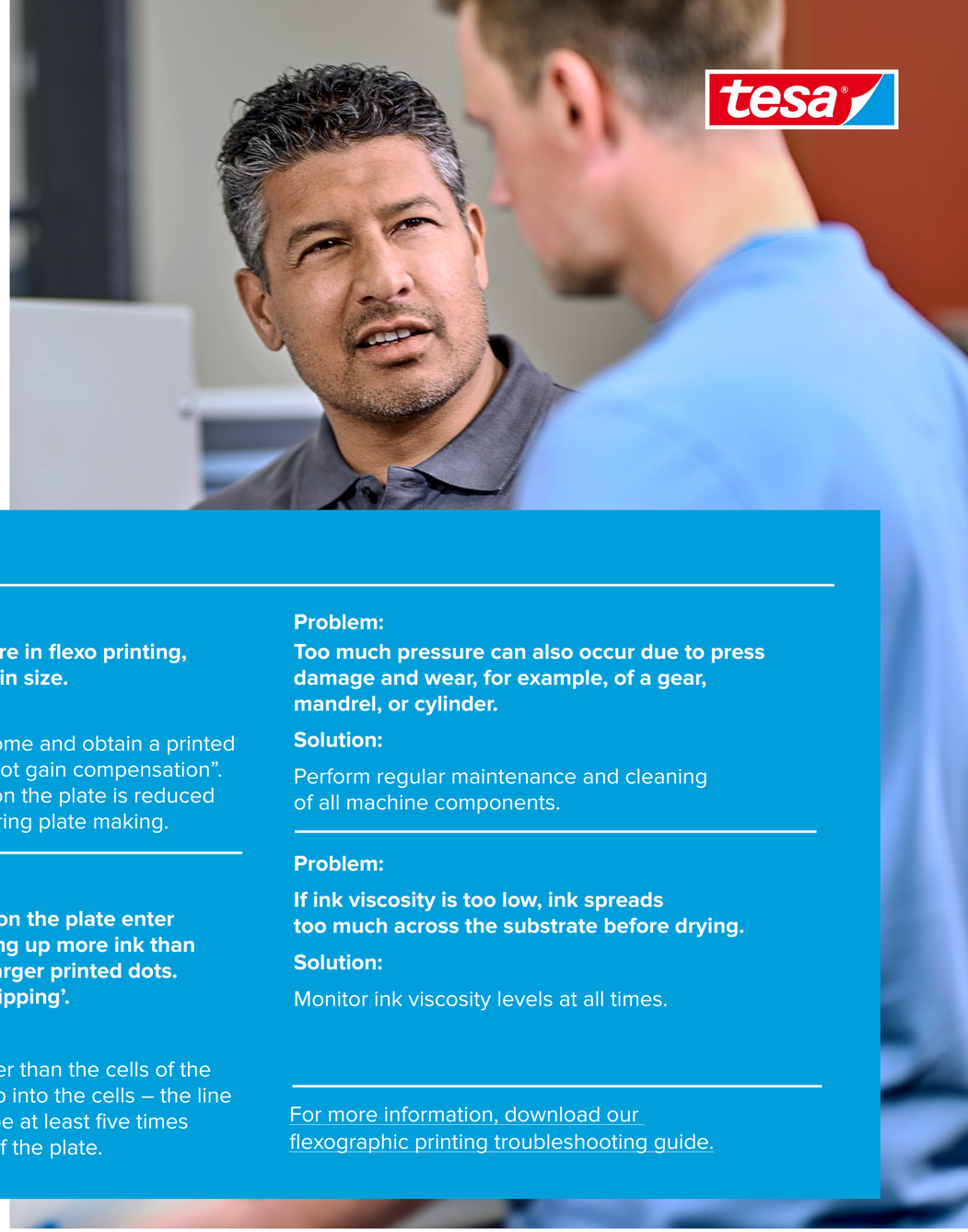
1. Excessive pressure
2. Substrates surface energy/quality
3. Ink/solvent balance
4. Sleeve/cylinder/anilox quality and maintenance
5. Initial impression set up quality
6. Low ink viscosity
7. The wrong choice of tape hardness

“So the more accurate our tape is, the higher the quality, the more accurate, and more secure the whole machine runs and the whole job runs.”

Franziska Kirpal
Sales Manager Printing & Packaging Solutions DACH
tesa

Common print quality issues

Example #1: Dot gain



What is dot gain?

Dot gain is when the dots that make up the image on the print become larger than they should be. The printed image then appears darker than intended, details become fuzzier, and there are changes in hue and saturation. Due to the pressure in the print process, you will always have some dot gain – when there is too much, it does become a problem.

Impact:

1. **Increased downtime:** more time is required to calibrate equipment and solve issues, reducing production efficiency.
2. **Unwanted waste:** defective printed material generates more waste during testing and adjustments.
3. **Reduced print quality:** dot gain is a particular problem in soft vignettes down to zero. Here, the smallest still-printing dots are printing larger than intended.
4. **Higher operating costs:** costs increase due to excessive ink consumption and extra time required for adjustments.

Potential causes and solutions

Problem:

Dot gain can be caused by excessive pressure within the settings of the print cylinder, impression cylinder, and anilox.

Solution:

Check your impression settings of the print cylinder to the substrate and anilox roller to the plate when encountering dot gain during printing.

Problem:

A mounting tape that is too hard or a plate that is too thick means the contact pressure of halftone dots to substrate is too high.

Solution:

Select the correct foam hardness level of your plate mounting solution and mount plates thoroughly. Also check if the thickness of your printing plate is correct.

Problem:

There will always be pressure in flexo printing, resulting in dots increasing in size.

Solution:

To achieve the desired outcome and obtain a printed dot of the right size, apply “dot gain compensation”. This means the original dot on the plate is reduced in size to a certain extent during plate making.

Problem:

Dot gain occurs when dots on the plate enter the cells of the anilox, picking up more ink than intended, which results in larger printed dots. This is also known as ‘dot dipping’.

Solution:

Make sure that dots are larger than the cells of the anilox so that they cannot dip into the cells – the line screen of the anilox should be at least five times higher than the line screen of the plate.

Problem:

Too much pressure can also occur due to press damage and wear, for example, of a gear, mandrel, or cylinder.

Solution:

Perform regular maintenance and cleaning of all machine components.

Problem:

If ink viscosity is too low, ink spreads too much across the substrate before drying.

Solution:

Monitor ink viscosity levels at all times.

For more information, download our flexographic printing troubleshooting guide.

Common print quality issues

Example #2: Pinholing

A loss of density. Reduced color vibrancy.

A common issue with flexible packaging motifs is the so-called ‘pinholing’ effect. This describes the uneven or incomplete ink distribution when printing a solid area, resulting in a loss of density and a reduced color vibrancy. Only continuous ink films reflect light evenly and only then does a solid area look appealing to the consumer looking at a package on display in a supermarket shelf.

Impact:

1. **Reduced print quality:** pinholing impairs both the visual quality of the final product and its functionality, especially in applications where uniform coverage is critical.
2. **Increased delays:** more time is required to solve issues, reducing production efficiency, and creating delays to delivery schedules.
3. **Higher operating costs:** the effect may lead to jobs being reprinted or adjusted, which adds to production costs.

Potential causes and solutions

Problem:

The ink dries on the anilox roller and does not transfer to the plate.

Solution:

Use solvents that take longer to evaporate; decrease the hot air dryer temperature; or increase the speed of the press.

Problem:

The ink forms an uneven film or does not form on the substrate.

Solution:

The surface tension of the ink may be too high to flow into place on the substrate. Check the ink viscosity and adjust accordingly. It may also help to check the surface tension of the substrate and use a more suitable solvent for cleaning.

Problem:

If the anilox is worn or plugged, it is unlikely to achieve a consistent, even ink film on the substrate.

Solution:

Examine the anilox and clean or replace if necessary – an anilox roller with higher volume could also be a solution.

Problem:

There may be dirt on the impression cylinder.

Solution:

Clean the impression cylinder using the right solvent.

Problem:

Insufficient pressure during printing.

Solution:

Use a higher impression setting or use a tape with a harder form.

For more information, download our flexographic printing troubleshooting guide.

The 5 steps you can take today to improve your output, flexibility, and print quality.

1 Choose the right plate mounting tape

Using the wrong plate mounting tape can result in everything from edge lifting to plate tearing.

tesa® Softprint plate mounting tapes are specifically designed for high-speed print jobs and are optimized to withstand high pressure. Their advanced adhesion properties also make them suitable for a range of printing conditions.

These tapes are designed for easy removal, and have controlled release properties that allow uniform separation without leaving residue.

For the best results, it is important to choose foam tapes with high resistance to delamination, which are formulated for high temperature environments or extreme printing conditions.

In simple terms, the better the tape quality, the greater the foam resilience, and the better the overall print quality. Together with our Efficiency Experts, we will find the right tape for your application.

2 Control pressure and conditions

To minimize plate edge lifting and plate movement, apply even pressure during mounting across the entire tape surface, using rollers or specific tools.

Selecting tapes with the right compressibility helps absorb vibrations without altering dot shape. This maintains print stability and prevents dot expansion.

Foam resilience is also key. The high-quality foam used in tesa® Softprint plate mounting tapes, ensures consistent results even on long print jobs, and eliminates the need for impression setting adjustments once the desired machine speed is reached. This allows machines to run at higher speeds for a longer time.

If your workspace has fluctuating temperature or humidity, use control systems to stabilize conditions and reduce the risk of lifting.

3 Perform preventive maintenance

Regular machine maintenance can help to prevent press stops, improve adhesion, and minimize misalignment.

Regularly clean cylinders and plates with nonabrasive products before mounting new tapes to improve adhesion and make demounting easier.

Examine tapes before removal to identify early signs of delamination, such as bubbles or partial foam separation.

Conduct routine checks to ensure the printing machine operates stably, without excessive vibrations or misalignment.

4 Create and follow Standard Operating Procedures (SOP)

Introducing best practices for mounting and printing, including how to properly handle tapes and plates, can reduce operator errors and improve consistency and efficiency.

Our experts can help you define effective SOPs that establish clear guidelines for cleaning, mounting, and dismounting. These ensure all your operators follow the same steps.

See our expert-approved SOPs as reference

5 Talk to our Efficiency Experts

Our experts can help to identify the micro-variables that improve productivity.

With a network of global flexo specialists, regional Customer Solution Centers and local, in-country expertise, we offer a wealth of real-world experience.

However, our experts don't simply help you solve product issues; we take time to understand your print setup, tailor tapes and formulations to specific projects and applications, and assess actual press conditions to help optimize your output.

Get in touch

Summary

- **In the competitive world of flexo printing, good enough is no longer good enough**
- **Tighter margins, shorter runs, and faster turnarounds mean pressroom efficiency is key**
- **However hidden inefficiencies and unseen productivity losses can hold you back**
- **Progress comes from working alongside a partner with the expertise to identify unseen issues, and develop solutions to overcome them**
- **The key challenges printers currently face can affect: Output, flexibility, quality, efficiency**
- **Using the right products, performing regular maintenance, following best practice, establishing SOPs, and talking to flexo experts can all bring about productivity gains**

Talk to our Efficiency Experts

Book a consultation with our experts today and benefit from decades of experience and insight, to improve the areas others overlook. Working in partnership, we can help you drive your print quality, upgrade your consistency, and deliver tried and tested press efficiency.

Get in touch