HEATSET
TROUBLESHOOTING GUIDE

SunChemical®
a member of the DIC group

storaenso

INTRODUCTION

Things can go wrong on heatset web offset printing presses even at the best of times.

When problems do occur, you need to act fast.

We have prepared this troubleshooting guide as an “emergency aid” to help printers on exactly those occasions.

Inside you will find **quick fixes** for many of the typical problems faced in heatset web offset printing.

The Lithographic process depends on several variable and inter-related products and equipment working together. One part can influence the others, so this guide also provides an introduction to **best practice**, helping you produce excellent results time after time.

The Heatset market is changing with wider format presses, different market needs, legislation changes, and greater environmental awareness. Sun Chemical and Stora Enso have worked together to provide a Partnership to the printer and help guide our customers through this process while working in a safe environment.

Sun Chemical and Stora Enso

SunChemical®
a member of the DIC group

storaenso

SunChemical®
a member of the DIC group

CONTENTS

SunChemical®
a member of the DIC group

ABOUT US

SUN CHEMICAL

Colour defines our lives – at each moment in any place. It gives the world a face we recognize, putting shape and quality into each day. Sun Chemical is the world's largest producer of printing inks, pigments, colorants and coatings.

Our products and services are used daily to create brilliant new printed materials. They contribute to the character of brands and distinguish them with a unique appearance. Sun Chemical provides profile to both products and companies, helping to communicate innovative ideas to a diverse world of people – for living in colour.

SunChemical®
a member of the DIC group

ABOUT US

Sun Chemical, a member of the DIC group, is a leading producer of printing inks, coatings and supplies, pigments, polymers, liquid compounds, solid compounds, and application materials.

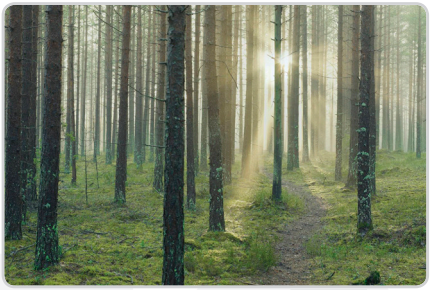
Sun Chemical has 10 research & development centers

Together with DIC, Sun Chemical has annual sales of more than $7.5 billion and over 20,000 employees supporting customers around the world.

Sun Chemical Corporation is a subsidiary of Sun Chemical Group Coöperatief U.A., the Netherlands, and is headquartered in Parsippany, New Jersey, U.S.A.
For more information, visit www.sunchemical.com

ABOUT US

STORA ENSO



Stora Enso is the second largest paper producer in Europe with an established customer base and a wide product portfolio for print and office use. Customers benefit from Stora Enso's broad selection of papers made from recycled and virgin fibre as well as our valuable industry experience, know-how and customer support.

Paper from Stora Enso is recyclable, renewable and biodegradable. In fact, 90 percent of our paper brands hold ecolabel certification recognizing their reduced environmental impact over the product life cycle.

We provide a broad range of renewable paper solutions for print media and office use. Working with leading publishers, printing houses, merchants, retailers, converters and office suppliers, we provide our customers with products that best fit their purpose.

ABOUT US

Part of the bioeconomy, Stora Enso is a leading global provider of renewable solutions in packaging, biomaterials, wooden constructions and paper. Our fibre-based materials are renewable and recyclable. Our solutions offer low-carbon alternatives to products based on fossil fuels and other non-renewable materials.

We believe that everything that is made from fossil-based materials today can be made from a tree tomorrow. Stora Enso has some 26 000 employees in over 30 countries.

For more information visit
http://www.storaenso.com/en/products/paper

BLISTERING

1

QUICK FIXES

- The dryer temperature is measured by IR cameras. Clean the optics
- Decrease dryer temperature
- Ensure that the dryer temperature measurement of the web is correct
- Ensure that you are using correct dryer profile for the paper type (LWC/SC/Imp News)
- Lower the press speed to make it possible to further decrease the dryer temperature.
- Print at the lowest acceptable density
- Try another reel taken from a different position in the Jumbo roll
  (See Stora Enso website for more information)
- Try another batch of the same paper

SunChemical®
a member of the DIC group

BLISTERING

1

Blistering problems usually originate from excessive moisture in the paper:
it is caused by “explosions” of water trapped beneath paper coating(s) that shows as bubbles in the print surface. High temperatures and high ink film weights increase its potential

BEST PRACTICES

- Check that the total area coverage (TAC) is not exceeding 300% on coated papers.
- Reduce ink coverage by applying UCR/GCR (Ink optimising systems) in prepress
- Optimise the dryer profiles for the papers most commonly used.
- Consult with the paper supplier regarding the moisture content specification for this paper
- Avoid storing the paper in conditions of high Relative humidity for long periods of time
- Only unwrap reels when ready to use
- Reseal partly used reels when finished
- Consult the paper supplier regarding the internal bond strength

CRACKING

2

QUICK FIXES

- Decrease drying temperature
- Increase humidity in web by applying more silicone emulsion or by using remoistening equipment
- Check that spine softener over the fold is working
- Check folding rollers, nip rollers, and reduce pressure if possible
- Check the former nose angle
- Check the condition of knife in folder and that it is aligned correctly
- Check the folder knife for build up
- Check tucker blade is not worn

Stitching line:

- Make sure that the stitches are not too tight and adjust if needed
- Adjust the stitching head pressure

SunChemical®
a member of the DIC group

CRACKING

2

Cracking appears
- When coating cracks over the spine (visual defect)
- In the folder causing detachment of centre pages after stitching

BEST PRACTICES

- Controlled humidity and temperature in the press room is beneficial (50 to 55% RH, 23°C)
- Make sure spine softener is available
- Invest in remoistening equipment

Stitched product:
- Use softer stitches
- Pagination quantity should be appropriate for saddle stitching
- Pre-crease on the longest side of the fold for thick covers

Paper:
- Use paper that has good folding properties
- Make sure the paper ordered is suitable for the application. Critical applications are for instance folded maps, gate folded covers, thick saddle stitched products and "thread sewed books"
- Pre-crease on the longest side of the fold

Lay-out:
- Avoid print over folding area

CREASING

3

QUICK FIXES

- Check the location and/or origin of the creases
  - check the pressure and tension of the paper infeed, also the setting of infeed angle
  - if creases are visible before and on the units this is probably paper related (no ink in the wrinkles) or wrong roll alignment at the reel stand
  - if creases are visible only after the units (ink in the wrinkles), check the guiding rollers etc.. for mechanical faults
- Reduce speed
- Check blanket condition
- Adjust web tension
  - Slightly higher tension often helps
  - Increase by 10-20% temporarily after running a narrow web
- Check former angle and turner bar pressure
- Clean the rollers and ensure that they can move freely
- Check the web guides are centred
- Check another reel from a different position
- Check the paper profile/winding
- Apply tape to the edge of an appropriate roller

SunChemical®
a member of the DIC group

CREASING

3

Tight folds or wrinkles in the printed sheet, usually in machine direction.

- Synonym: wrinkling

BEST PRACTICES

- Make sure rollers are regularly checked and bearings are maintained
- Make sure web tension adjustments are working
- Install spreader rolls at the reel stand exit
- If problems are related to one paper reel position, run all reels of this position after each other to avoid continuous web tension adjustments

FLUTING

4

QUICK FIXES

- Run at the lowest possible web temperature
- Play with web tension. Normally decreasing can help, but the effect can also be the opposite
- Ensure that remoistening equipment is working properly; switching it off sometimes improves the result
- Make sure silicone equipment is working correctly
- Print at the lowest acceptable density
- Make sure chill rolls are working properly and have correct temperatures (see appendix 3)
- Optimise ink–water balance

SunChemical®
a member of the DIC group

FLUTING

4

Waves in the web direction on the printed sheet.
- Synonyms: waviness, rippling

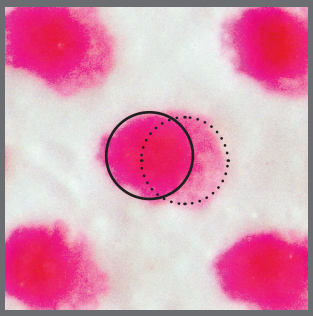
NOTE! Fluting is caused by the Heatset process and therefore cannot be totally eliminated on the printing press; however it can be reduced.

BEST PRACTICES

- Every action that increases humidity after the dryer normally decreases fluting
- Aim at controlled humidity and temperature in pressroom (RH 50% – 55%, 23°C)
- Optimise consumables towards lowest possible dryer temperatures
- Reduce ink film thickness (in prepress). e.g. UCR & GCR
- Fluting will decrease with time, especially if kept flat in bundles or bound copies
- Take paper reels into press room in time
- If the product is printed short grain – allow as much time as possible for the copies to acclimatise before perfect binding
- Paper choice – results can vary with different papers so work with the paper suppliers to find the optimum result

DOUBLING

5



QUICK FIXES

- Adjust web tension – infeed and chill roll tension
- Tighten the blanket
- Check blanket height profile is correct
- Blanket height must be similar across the width of the web; if not change blanket
- Change paper reel if it is slack on the edge
- If none of the above helps it is most likely a mechanical problem of the press, check first the infeed unit
- Check that blankets are cut straight (deviation < 0.5 mm per meter)
- Check that the plate cannot move
- Check jockey roller on infeed is constant and not erratic

SunChemical®
a member of the DIC group

DOUBLING

5

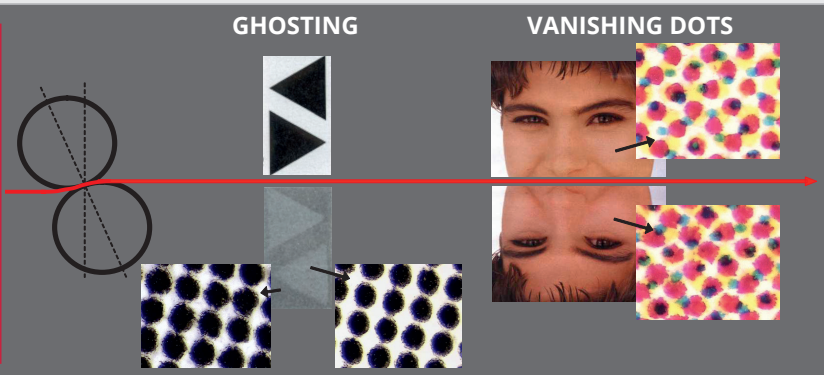
Shadow-like halftone dot beside the actual halftone dot.
- Synonym: dot slurring

BEST PRACTICES

- Controlled humidity and temperature in the press room are beneficial (RH 50% – 55%, 23°C)
- Use same type of blankets in all units to avoid differences
- Follow recommendations for blanket height (check especially after printing narrow webs)
- Re-tighten a new blanket after first job printed
- Routinely check for abnormal vibrations on the press

GHOSTING & VANISHING DOTS

6



QUICK FIXES

- Move the register, this helps to eliminate the microscopic build up between the dots that causes ghosting or vanishing dots
- Try to increase the web tension as much as possible
- Wash blankets
- Increased nip pressure (blanket packing) might help
- Try fixing the register to the yellow
- Check paper is not too cold (see appendix)
- Keep paper reels to room temperature

SunChemical®
a member of the DIC group

GHOSTING & VANISHING DOTS

6

A drop in print density on the halftone area which gets worse during the run commonly seen on coated papers.

Ghosting: - Appears on the side of web that leaves units last
- Local drop in print density following the shape of a dark image on the opposite side of paper (dependent on layout)
- Cold paper temperatures can also be a cause of ghosting

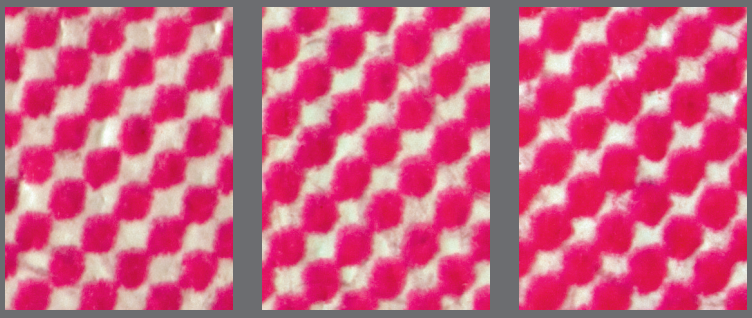
Vanishing dots:
- Appears as decrease in dot gain on a larger area, not influenced by an image on the other side (changing visual appearance)
- Usually appears on opposite side of the web than ghosting

BEST PRACTICES

- Install automatic register movement software
- Optimising the blanket has been shown to reduce the effect most
- For vanishing dots; make sure density levels are not unnecessarily high > is seen quicker with high density levels

INCORRECT DOT GAIN

7



QUICK FIXES

- Check that the problem is not doubling
- Adjust water settings to two points above the point of scumming
- Check that the print density is set at the recommended target for the paper type
- Check control strips on plate with a densitometer. Make new plates with corrected compensation curve if necessary
- Check ink form rollers for correct setting against plate cylinder
- Check that the right ink for the substrate on press is used
- Check the torque of the blankets
- Changing to a new blanket will usually increase dot gain
- Check that the unit temperatures comply with recommended levels (see appendix 3)

High Dot Gain

- Decreasing the temperature on the unit decreases the dot gain
- Changing to harder blankets will decrease the dot gain
- Higher blanket tension will decrease dot gain

SunChemical®
a member of the DIC group

INCORRECT DOT GAIN

7

Dot gain is the measure of the difference in dot size between plate and paper.

NOTE! If dot gain is not on target, the expected tone values cannot be reached.

BEST PRACTICES

> To evaluate the units dot gain characteristics, print frequently (twice a year) with linear plates using a test form.

Ink:

- Recommended condition of storage for ink is 20 – 25°C.
- Use your ink with the principle "first in – first out"
- Constantly check the roller temperatures, and adjust the cooling system of the units. Recommended temperature is 28±2°C on the ink duct. Recommended temperature on the ink vibrator roller is 30±2°C

Paper:

- Choose correct ICC profile and adapt compensation curve to reach the expected dot gain

Fountain Solution:

- Clean and change regularly the fountain solution and the filters. Contaminated fount can change emulsification properties which impacts Dot Gain.

7 INCORRECT DOT GAIN (CONT.)

QUICK FIXES

- Increasing web tension will decrease dot gain
- Higher print density increases dot gain

Low Dot Gain

- Increasing blanket-to-blanket pressure (under packing) will increase dot gain
- Changing to a new blanket of the same type usually shows higher dot gain
- Increasing the temperature on the unit increases the dot gain

General

- Slight changes in dot gain can be achieved by:
  - Alternating the water settings
    reduced water = less dot gain,
    increased water = more dot gain
  - Changing blanket to blanket pressure
    reduced pressure = less dot gain,
    increased pressure = more dot gain

(CONT.) INCORRECT DOT GAIN

BEST PRACTICES

Fountain Solution (cont.):

- If the temperature difference between incoming and outgoing water is more than 2°C, circulation is not sufficient
- Be careful with the contamination by solvent (washing system). Try to run with impression off during blanket washing

Blankets:

- Check blankets for faults after each job and clean properly with suitable cleaning agent
- Avoid using over aged blankets
- Check blanket tension and under packing regularly

Plates:

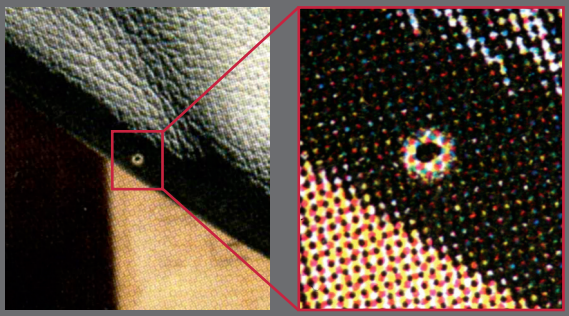
- Check regularly that the plate making process is producing plates with the expected dot gain
- Use correct under packing corresponding to the thickness of the plate. Measure the thickness of the plates regularly

Rollers:

- Check roller settings once per week according to the manufacturer's recommendations or in house specifications
- Check the temperature profile of the rollers once a week as preventive maintenance (see appendix 3)

HICKEYS

8



QUICK FIXES

- Wash blankets, clean plates
- Empty and clean the ink duct. Wash the rollers and train if needed, use cleaning agent
- If only on one side of the web, change unwinding direction (if possible)
- Check a different paper lot
- If the problem exists on all presses connected to the same ink supply, change ink filter and batch of ink
- Clean and inspect the roller train. Make sure that all rollers are in good condition
- If using a zero speed paster – turn paper over
- Take paper pulls for analysis

SunChemical®
a member of the DIC group

HICKEYS

Foreign particles prevent transfer of ink to the paper. Hickeys appear as round, ellipsoid or fish eye-like spots, (doughnuts) on the printed image.

8

BEST PRACTICES

- Clean the press thoroughly, including deposits and accumulations of ink in the duct and fountain tank on a regular basis
- Ensure the rotation of inks in the warehouse, first in – first out.
- Mother bins, pumps and filters should be cleaned or changed regularly (every 6-12 months)
- Inspect pressroom and press for cleanliness. Check heating and air conditioning systems for circulation of dust or particles
- Vacuum surfaces of equipment located over the press units such as lights. During cleaning time, protect press from falling particles
- Wrap partly used reels properly, including edges
- Obtain a primary pick sample for analysis

PICKING

9

QUICK FIXES

- Wash the blankets
- Lower the tack by adding reducer to the ink.
- Increase the water feed
- Increase the temperature of the ink train by 2-3°C if the rollers are less than 26°C
- Change unwind direction of paper reel if possible
- Change to an alternative paper if possible
- Take paper pulls for analysis

SunChemical®
a member of the DIC group

PICKING

Coating or fibres lifted from the paper surface

9

BEST PRACTICES

- Ensure stock rotation of inks in the warehouse, first in – first out
- Use blankets with good release properties
- Store paper at the recommended temperature (see appendix 3)
- Routinely check that the blanket to blanket nip loads are not too high

LINTING

10

QUICK FIXES

- Wash the blankets
- Increase the water feed
- Add anti-linting agent to the dampening solution (this may require lower fount dosage to avoid over-emulsification)
- Lower the ink tack with a reducer
- Check that fount dosage is correct
- Change to an alternative paper if possible

SunChemical®
a member of the DIC group

LINTING

10

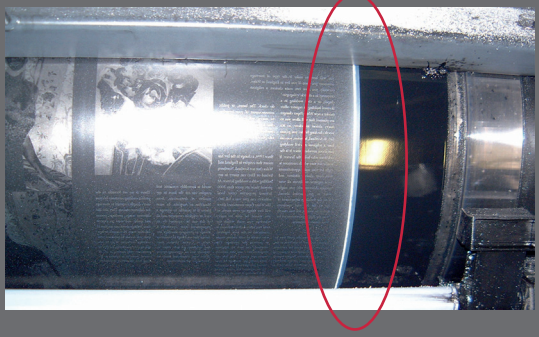
Fibres or fillers lifted from the paper surface, mainly on uncoated stock

BEST PRACTICES

- Use an ink designed for uncoated paper
- Check that the automatic blanket washing device is working properly
- Prioritise the substrates according to performance in cooperation with your sales department or customer
- Use a blanket wash program with water where appropriate

EDGE DUST

11



QUICK FIXES

- Wash blankets, preferably by hand, especially the first unit. Consider washing with water
- Wipe the edges of the paper reel with a damp cloth
- Test another reel from a different jumbo reel position
- Check that the blankets aren't swollen at the edges
- Check that the blanket to blanket nip load is correct
- Assess the manufacturing reel position from the label and try a reel from a different position
- Change to an alternative paper if possible

SunChemical®
a member of the DIC group

EDGE DUST

11

Edge dust is an accumulation of fine particles coming from the edges of the paper reels

BEST PRACTICES

- Eliminate build-up on end of rollers by more frequent regular washing
- Use mourning bands
- Consult the paper supplier for paper reel identification

PILING

12

QUICK FIXES

High surface temperatures have a huge effect on piling. Make sure that you run all units within the recommended temperature range.

Check if the piling occurs all over the width of the blanket or locally.

> *If it shows locally, the reason is most likely roller settings.*

- Remember to adjust the rollers when switching between narrow and wide web jobs

> *If the piling is all over the web width the reason is most likely chemistry related. Then for:*

Non-image area piling (negative piling) – on the same unit:

- Increase the fountain solution concentrate dosage and evaluate the result
- Perform an initial blanket wash, just after make ready
- Try a new plate and make sure this one is fully developed
- Check if negative piling occurs on other presses connected to the same ink supply – if yes, try another batch of ink
- Change to an alternative paper if possible
- Wash the affected unit with roller paste and shampoo

SunChemical®
a member of the DIC group

PILING

12

Piling is the accumulation of excess ink and/or paper residue on the blanket

BEST PRACTICES

> Several variables affect piling. It is essential to ensure the stability of the fountain solution / water quality.

Stable ink/water balance is crucial to minimise piling.

- Control the incoming water supply daily and pay extra attention to variations
- Use reverse osmosis and rehardening especially in areas of changing water hardness.
- Control the fountain solution concentrate dosage (see appendix 4)
- Compare the current conductivity and pH with standard reference values given to you by your fount supplier. (see appendix 4)
- Quick release blankets can help to reduce piling
- Aggressive blanket washes can be detrimental for the release properties

QUICK FIXES

Image area piling (positive piling) – on the same unit:

- Increasing the water feed may help
- Decrease the temperature of the fountain solution but not below 10°C
- Ensure that the temperature of the ink tray does not exceed 32°C but in case of problems, it is recommended to set the temperature to 28°C
- Reduce the tack of the ink with a tack reducer paste
- Start make ready with high ink settings to increase lubrication
- Perform an initial blanket wash, just after make ready, preferably by hand. (Press must be stopped)
- Change to a new blanket
- Try a new plate and make sure this one is fully developed
- Check if piling occurs on other presses connected to the same ink supply – if yes, try another batch of ink
- Change to an alternative paper if possible
- Reduce blanket temperatures (not below 26°C)

Carry-over piling (back trapping)

> for example black ink transferred to the magenta unit

- Alter the ink feed, either higher or lower. Excess ink can transfer to the blankets of the following units and a thin ink film can build up tack causing the exact same problem.
- Increase the water feed of the unit of the ink showing the carry over piling (in the given example water must be increased in the black unit)
- Add tack reducer paste to the ink showing the carry over piling (in the given example tack reducer must be added to black)

BEST PRACTICES

- Check that the automatic blanket washing device is working properly
- Increased temperature can cause piling. Measure the temperature profile of the rollers.
- A deviation of 5°C across the width of the unit indicates potential problems with piling
- Make sure that the plate making process is working correctly. Check chemistry according to a maintenance plan. Set up a maintenance plan for the plate making process if not already available.
- Mechanics (bearings) and setting condition of the press rollers should be maintained according to a plan
- Check that the best blanket wash programme is being used with the correct solvent/water ratio

PLATE BLINDING

13

QUICK FIXES

If the problem occurs on one colour only, it's most likely caused by ink but if it's on more than one colour, it's probably caused by Fount solution chemistry or due to plate processing.

- Ensure fountain solution dosage is correct (pH, conductivity)
- Clean the plate and inspect it. Change if damaged.
- Check if plate blinding occurs on presses using a different plate processing line but are connected to the same ink supply –if yes try an alternative ink, if no try new plates (probably of a different make or batch and/or renew plate making process chemicals)
- Check that the blanket wash is not contaminated

SunChemical®
a member of the DIC group

PLATE BLINDING

Plate blinding is a progressive loss of the image area caused by physical or chemical attack.

13

BEST PRACTICES

- Install routine maintenance for the plate making process (developer, baking and gum)
- Follow strictly plate manufacturer's recommendations concerning the maximum number of plates to be processed prior to renewing process chemistry.
- Cleaning the press dampening system might involve very aggressive chemicals. Make sure all parts of the dampening system that came into contact with cleaning agent are thoroughly rinsed with water before restarting the press.
- Use Technical Audit to plan the cleaning procedure of the fount circulator, then control daily pH, conductivity, temperature and circulation (including filtration)
- Use only solvents and cleaners on the plates, blankets and rollers that are recommended for this purpose

Note: If you use process less plates make sure you apply a fount solution fit for that purpose.
SunFount® 6339 is approved.

INK FEEDBACK

14

QUICK FIXES

- Clean the rollers, reduce the fount and ink settings and restart.
- Check the fountain solution temperature. Should not exceed 15°C in the fount pan.
- Increase the flow rate in the fount pan to avoid temperature differences across the width of the unit.
- Decrease temperature of the fountain solution: avoid temperatures in the pan below 10°C (condensation problems)
- Ensure the damper rollers are cleaned with a fast evaporating solvent
- Clean and refill the fount tank, check that supply pipes are clear
- Control and adjust the unit temperature (see appendix 3)
- If the feedback is present locally, stop the press and control the nip pressure and adjust it if necessary
- Check if feedback occurs on other presses connected to the same ink supply – if yes, try an alternative ink
- The problem usually is worse while printing on uncoated paper grades. If possible try an alternative paper.
- Use scavenger bars if possible to keep a low build-up of ink

SunChemical®
a member of the DIC group

INK FEEDBACK

Feedback is the contamination of the fountain solution system by ink. Over emulsification is the largest cause of feedback.

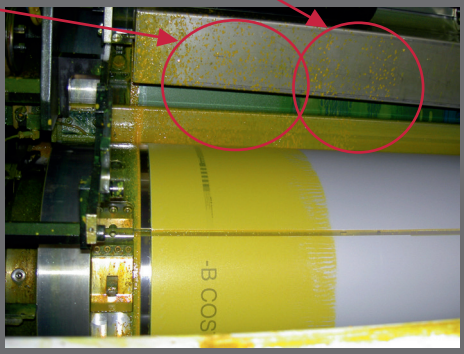
14

BEST PRACTICES

- Use the correct ink depending on the application
- Routinely check roller conditions (nips, shore hardness and contamination)
- Make sure water hardness is stable all year round
- Prioritise the substrates according to performance in cooperation with your sales department or customer
- Check and adjust the dosage of the fountain solution concentrate on a daily basis
- Have a maintenance plan for the units in use

SLINGING & MISTING

15



QUICK FIXES

- Decrease ink duct temperature to a minimum of 24°C measured while running.
- Decrease roller temperature to a minimum of 28°C measured while running.
- Reduce the water settings if possible
- Adjust the skew of the fount duct (metering roller) with the width of the paper
- Inspect rollers for damage
- Check the ink roller settings and adjust
- Print at the lowest acceptable density
- Check if misting - slinging occurs on other presses connected to the same ink supply – if yes, try an alternative ink

SunChemical®
a member of the DIC group

SLINGING & MISTING

15

Slinging (flying) is large drops formed on the ink roller train mostly on the edge of the rollers

Misting is a fine spray of ink formed during film splitting between the inking rollers

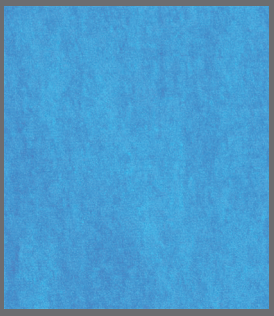
BEST PRACTICES

- Temperature of the units is key for the amount of misting; lower temperature = less misting. Most important is to routinely check and maintain the function of the cooling system
- Routinely check and adjust temperatures of the inking train (see appendix 3)
- Check roller settings regularly
- Control the dosage of the fountain solution concentrate on a daily basis
- Apply a screen on the plate outside the printing format (mourning bands). The installation of a scraper device is recommended for wide format presses.
- Reduce ink coverage by applying UCR/GCR (Ink optimising systems) in prepress.

MOTTLING

16

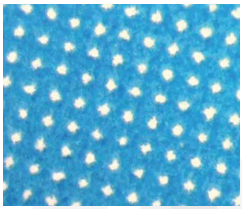
NO MOTTLING



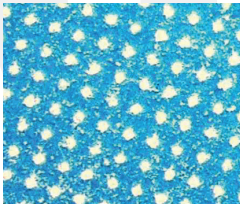
MOTTLING

QUICK FIXES

- Check paper temperature is not too cold. Not below 15°C
- Adjust water settings to two points above the point of scumming.
- Check fountain solution dosage is accurate
- Clean the blankets
- Check ink and fount roller settings
- Adjust the skew of the fount duct if necessary
- Check the condition of the blanket and replace if needed
- Check the paper formation by holding it up to the light
- Try an alternative paper if possible



BACK TRAP MOTTLING



WATER MOTTLING

SunChemical®
a member of the DIC group

MOTTLING

16

Unevenness of density in printed image screen area only. The size of the darker/lighter areas is usually a few millimetres.

- Synonyms: grainy print, cloudiness

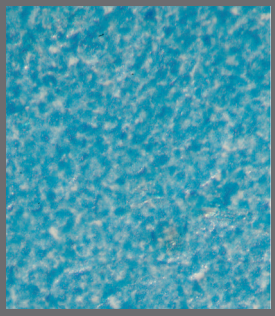
BEST PRACTICES

- Avoid cold paper. Paper should be stored at room temperature. Minimum temperature is 15°C

SOLID LAY (see also mottling)

17

GOOD



POOR

QUICK FIXES

- Check paper temperature is not too cold. Not below 15°C
- Increase density
- Reduce water
- Clean the blankets and check their condition. Replace if necessary.
- Adjust blanket to blanket pressure (press specifications)
- Check that this is not plate wear
- Control fountain solution (pH, conductivity). Inappropriate fountain solution or wrong dosage can cause poor solid lay

SunChemical®
a member of the DIC group

(see also mottling) SOLID LAY

17

Even print appearance & density on an area with 100% coverage of one colour

BEST PRACTICES

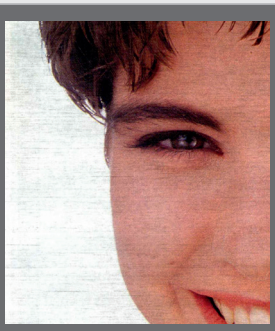
- Use smooth blankets
- Check plate thickness (already in prepress department)
- Check and adjust the dosage of the fountain solution concentrate on a daily basis

TINTING/TONING/SCUMMING

18

TINTING

TONING



SCUMMING

QUICK FIXES

Tinting

- Check if your fountain solution is abnormally coloured or polluted. If yes check dosage of fountain solution concentrate and colouration. Clean and refill the fountain solution reservoir with an alternative fount and/or correct dosage.

Toning

- Increase water feed and run at lowest possible density
- Check plate temperature. The temperature of the plate should not exceed 34°C
- Clean the plate with a plate activator; if this does not solve the problem, you are faced with scumming
- Check the plate development process is working correctly

Scumming

- Check if scumming occurs on presses using a different plate processing line but are connected to the same ink supply – if yes try an alternative ink, if no try new plates (probably of a different make and / or renew plate making process chemicals)
- Check the metering roller settings are correct

SunChemical®
a member of the DIC group

TINTING/TONING/SCUMMING

18

Tinting: The non image area of the paper is toned due to coloured fountain solution (caused by contamination)

Toning: The non-image area of the plate accepts ink and transfers it to the paper

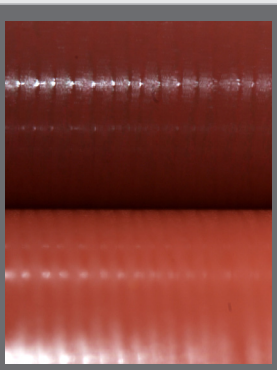
Scumming: The inability of water to keep the non-image area of the plate clean. Scum cannot be washed from the plate

BEST PRACTICES

- Check and adjust the dosage of the fountain solution concentrate on a daily basis. Too low concentration can cause scumming.
- Strictly follow plate manufacturer's recommendations concerning the maximum number of plates to be processed prior to renew process chemistry.
- Control visually the colouration of your fount solution concentrate on delivery. Question a more strongly coloured product.

CORDING

19



QUICK FIXES

- Check that the fountain solution is clean. If necessary drain, clean and re-fill with fresh fountain solution
- Check that the ceramic damper rollers are uncontaminated and clean. If necessary, clean with a product such as Hydrocer Clean S
- Clean and degrease the ink duct roller (use appropriate product e.g. Helioprint paste / Marine shine)
- Consider reducing the chrome to form roller pressure to reduce the scraping between your pan roller and form roller

SunChemical®
a member of the DIC group

CORDING

19

Cording results in lines in web direction typically in 30 - 50% screens. They can usually be seen on the damping roller(s).

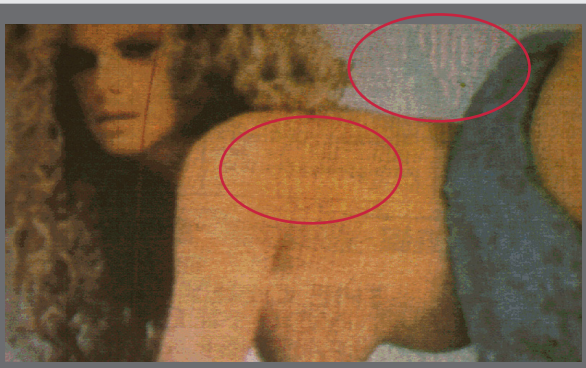
One Theory is that the surface speed of the metering roller and the surface speed of the pan roller are often geared to be very different and this scraping action is what causes the 'cording'.

BEST PRACTICES

- Clean the ceramic damper rollers on a regular basis ensuring the pores are completely clean
- Empty the fountain solution tank and clean on a regular basis
- Use a fountain solution that helps to keep the solution clean

SAND DUNING

20



QUICK FIXES

The usual methods to control or eliminate it are damp levels, speed, blanket height and type (compressibility, face compound and grind profile can all affect sand duning).

To help reduce or eliminate the issue:

1) Check blanket heights on press and ensure that they are at the correct level for the press
2) Ensure that they are running with minimum damp settings
3) Check the impression stripe of plate to blanket cylinder (iron to iron settings) and adjust if necessary
4) Evaluate the speed effect (time under impression rather than impression pressure)

SunChemical®
a member of the DIC group

SAND DUNING

20

Sand Duning or Ridge Linting is normally associated with newsprint grades of paper and first came to the notice with the Coldset printing community in the late 80's early 90's predominantly on Goss T70 presses.

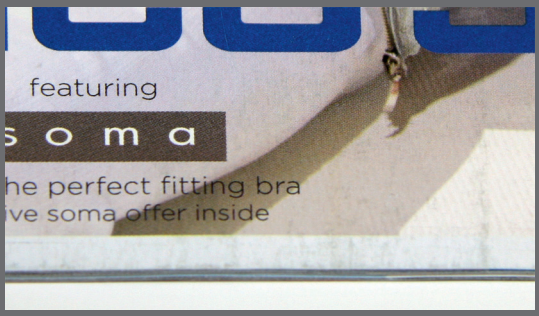
Basically it is a build up of lint on either the plate or blanket that forms into waves or ridges and slowly moves as the print run progresses. It can occur as quickly as 20,000 copies into a run and is normally only seen on one side of the sheet.

BEST PRACTICES

- Check blanket heights regularly
- Ensure that the iron to iron settings are checked as part of the routine maintenance
- Weekly checks of fountain solution conductivity and pH are conducted
- Optimise damp and ink curves

POOR RUB/SCUFF RESISTANCE

21



QUICK FIXES

- Ensure gentle handling of the paper web and printed sections at all stages
- Make sure that silicone equipment is working and increase amount of silicone if possible
- Make sure the nip/draw rollers are correctly set according to the paper caliper. Note that the paper thickness is important, not the basis weight (g/m^2)
- Adjust speed of the conveyor belt to the speed of stacker
- Ensure the sections are properly stacked and that the sections cannot move in the bundle, but avoid excess pressure. Uneven bundles can cause the sections to move against each other
- Avoid all extra transportation and ensure gentle handling of the bundles
- Ensure belts are correctly set and avoid extra movement and pressure

Note: see also marking

SunChemical®
a member of the DIC group

POOR RUB/SCUFF RESISTANCE

Ink transfers from inked area of one page to the facing page. This is mainly a problem for silk, matt and high basis weight glossy coated papers and is normally not due to inadequate drying.

21

BEST PRACTICES

- To achieve best possible result; silk & matt papers should be protected by varnish.
- Use rub resistant inks
- Silicone substitute products such as wax emulsions generally protect the surface better than standard silicone
- Clean chill rollers and turner bars with recommended impression cylinder cleaner
- Discuss critical designs with your client
- Try to minimise movement within the press and post press processes.

MARKING

22

QUICK FIXES

Printing units:

- Run at lowest possible ink and water feed

Dryer:

- If the marking is on the top of the web, reduce the web tension
- Increase the dryer temperature, in case the reason is insufficient drying. Note that this has a negative impact on the printed quality in general
- Decrease the press speed
- Check that the air-knife at the exit of the dryer is working

Chill rollers:

- Check that water cooling through the chill rollers is set correctly. (See appendix 3)
- To reduce the thermal shock, increase the temperature of the 1st chill roll to limit condensation of ink solvent.

SunChemical®
a member of the DIC group

MARKING

Traces of ink or other residues on areas where it should not be present. Shows also as scratches in heavily inked areas. There are many possible causes / sources for marking.

22

BEST PRACTICES

As best practise and as a preventative measure, all areas should be kept as clean as possible.

Printing and prepress:

- Reduce ink coverage by applying UCR/GCR (Ink optimising systems) in prepress.

Dryer:

- Ensure that the web temperature is measured correctly. We recommend 90 to 120°C between the exit and the first chill roll. For a modern dryer with a cooling zone, the temperature should be on a low level and for older models on a high level. (For details, see appendix 3)
- Check the set-up of the dryer: The pressure in the dryer should be lower than the surrounding air pressure
- Ensure that web tension control is maintained
- Ensure that the internal web temperature sensors are measuring correctly and cleaning is done according to supplier's recommendations

QUICK FIXES

Chill rollers (cont.):

- Clean the chill rollers and turner bars with impression cylinder cleaner and repeat the action if required

Turner bar and "plough" folder section:

- Disengagement of the grater roller sometimes helps.
- Increase the amount of silicone emulsion
- Try to change the rotation of the silicone rollers where possible and assess potential improvement and / or increase silicon application roller speed. (Usually it's best to run the silicone rollers in web direction with coated papers and against the web with uncoated papers).

- Check and adjust:
  - air flow of the turner bars (the web should not be in contact with the bars)
  - traction rollers (rider) on the former fold
  - the air flow and angle on the former fold
  - the adjustments of the two infeed rollers on the former
  - the pressure of nip/draw rollers in the folder
  - the rollers of the chopper fold to be parallel

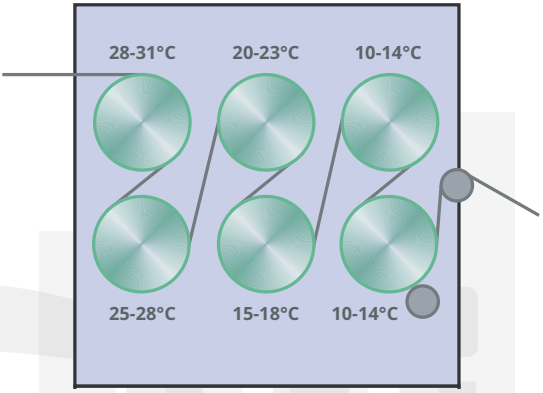
Postpress:

- Speed has to be adjusted to the stream delivery
- Make sure all belts and rollers are moving properly on the stream delivery
- Reduce static electricity for example by adding anti-static product in silicone

BEST PRACTICES

Chill rollers:

- Make sure that the automatic system for cleaning the cylinders during the production is working. Installation of one is recommended.
- Recommended temperatures of outgoing cooling water in each cylinder:
  - Web temperature after chill rollers should not be below 20°C.
  - Folder marking is likely to increase if temperature exceeds 30°C



- Ensure EcoCool systems and other Silicone application equipment have a weekly maintenance programme.

Turner bar and folder section:

- Avoid too high web tension between chill rollers and folder
- Check and regularly control silicone equipment, usage, storage and type (Anti-Static, Teflon, Wax...).
  Never expose silicon emulsion to freezing temperatures.

BLOCKING

23

QUICK FIXES

Printing units:

- Run at lowest possible ink and water feed

Dryer:

- Increase the dryer temperature, in case the reason is insufficient drying. Note that this has a negative impact on the printed quality in general
- Decrease the press speed
- Check that the air-knife at the exit of the dryer is working
- Check that the correct Paper profile has been set where appropriate.

Chill rollers:

- Check that water cooling through the chill rollers is set correctly. (See appendix 3)
- To reduce the thermal shock, increase the temperature of the 1st chill roll to limit condensation of ink solvent.

SunChemical®
a member of the DIC group

BLOCKING

23

Blocking is observed in the logs and makes feeding in the bindery machines difficult.
If the separated print copies tear and damage the print film, it's more likely to be a drying problem. If the separated copies do not damage the print film this is true blocking.

BEST PRACTICES

As best practise and as a preventative measure, all areas should be kept as clean as possible.

Printing and prepress:

- Reduce ink coverage by applying UCR/GCR (Ink optimising systems) in prepress.

Dryer:

- Ensure that the web temperature is measured correctly. We recommend 90 to 120°C between the exit and the first chill roll. For a modern dryer with a cooling zone, the temperature should be on a low level and for older models on a high level. (For details, see appendix 3)
- Check the set-up of the dryer: The pressure in the dryer should be lower than the surrounding air pressure
- Ensure that web tension control is maintained
- Ensure that the internal web temperature sensors are measuring correctly and cleaning is done according to supplier's recommendations

QUICK FIXES

Turner bar and "plough" folder section:

- Alter the silicone dosage and assess any changes
- Try to change the rotation of the silicone rollers where possible and assess potential improvement and / or increase silicon application roller speed. (Usually it's best to run the silicone rollers in web direction with coated papers and against the web with uncoated papers).
- Ensure Eco Cool systems are using a 40% silicone without wax

Stackers:

- Check the correct strapping pressure is used on the logs in the stacker
- Do not shrink wrap the logs while still warm and before solvent has been released from the logs

BEST PRACTICES

Chill rollers:

- Make sure that the automatic system for cleaning the cylinders during the production is working. Installation of one is recommended.
- Recommended temperatures of outgoing cooling water in each cylinder:
  - Web temperature after chill rollers should not be below 20°C.
  - Folder marking is likely to increase if temperature exceeds 30°C *(see diagram in section Marking)*
- Ensure EcoCool systems and other Silicone application equipment have a weekly maintenance programme.

Turner bar and folder section:

- Avoid too high web tension between chill rollers and folder
- Check and regularly control silicone equipment, usage, storage and type (Anti-Static, Teflon, Wax...).
  Never expose silicon emulsion to freezing temperatures.

Stackers:

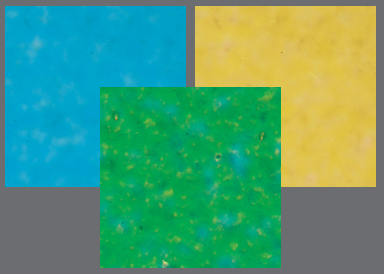
- Strapping should be applied to the stacker manufacturer's recommended pressure. Do not use excessive pressure.
- Avoid shrink wrapping logs while the print is still warm

Inks:

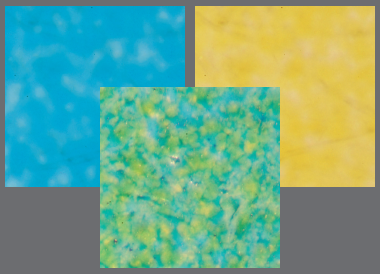
- Discuss options with your ink supplier. Black is often the worst colour for blocking so avoid excessive UCR/GCR (Ink optimising systems) usage.

INK TRAPPING

24



GOOD TRAPPING



POOR TRAPPING

QUICK FIXES

- Reduce the tack of the following printed colours (use tack reducer if necessary)
- Increase unit temperature of the following colours
- Minimise damper settings where possible especially on the first units.
- Use an alternative ink set.

SunChemical®
a member of the DIC group

INK TRAPPING

How well ink transfers on to previously printed ink. Very important for correct reproduction of secondary colours.

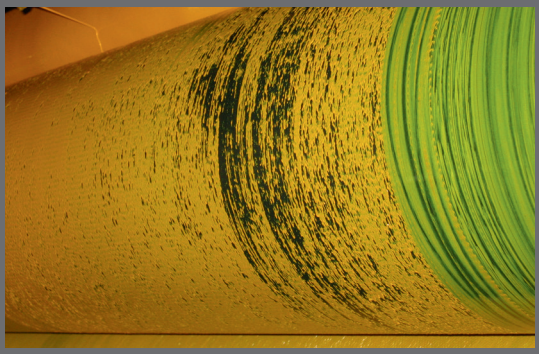
24

BEST PRACTICES

- Control ink and water balance and density
- Use your ink with the principle “first in – first out”

INK DUCT ROLLER STRIPPING

25



QUICK FIXES

- Print with lowest possible water feed
- Increase the ink duct roller temperature
- Clean and degrease the ink duct roller (use appropriate product e.g. Helioprint paste or Marine shine)
- Check the fountain solution concentration. Too high concentration may cause stripping

SunChemical®
a member of the DIC group

INK DUCT ROLLER STRIPPING

25

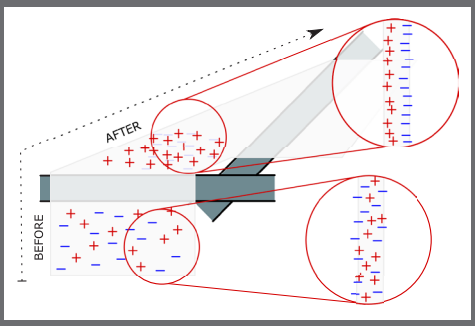
Ink duct roller becomes less acceptant for ink.
The problem is often confined to ceramic rollers.

BEST PRACTICES

- Very acid founts (pH below 4.0) usually accelerate the problem
- Clean the ink duct roller on a regular basis (once per month)
- Follow guidelines for ink duct roller temperatures (see appendix 3)
- If possible increase the air flow across the unit

STATIC

26



QUICK FIXES

Static is a problem that cannot be totally eliminated in the web Heatset process, but it can be reduced.

- Acclimatise paper in the press room without unwrapping to maintain the relative humidity of the paper close to its original moisture content
- Use a silicone with anti-static content or add an anti-static product like fabric conditioner
- Ensure the silicone dosage is correct and silicone rollers are applying sufficient silicone emulsion to remoisten the web
- If any anti-static equipment is used ensure it is working correctly
- Decrease dryer temperature

SunChemical®
a member of the DIC group

STATIC

26

Static is caused when contact between paper and metal or plastic parts of the press pull apart creating a surplus of positive or negative electrical charges.

The static causes problems of paper release in sheeters, folders, stackers and bindery operations especially on smoother papers.

BEST PRACTICES

As a general guidance, cold paper, dry conditions after the dryer, and low humidity increase the problem. Increased moisture will increase the conductivity and dissipate the charge. Static build up will become a problem when the relative humidity is below 40% and will become extremely difficult if this reaches <30% RH.

- If possible keep the relative humidity of the press room above 40% and ideally between 50% and 55%.
- Use anti-static discharge equipment
- Select a silicone emulsion with anti-static content
- Do not use cold paper. Always ensure the paper is correctly acclimatised in its wrapping before use
- Make sure there is some sort of grounding device on the press
- Humidify the press room

APPENDIX 1

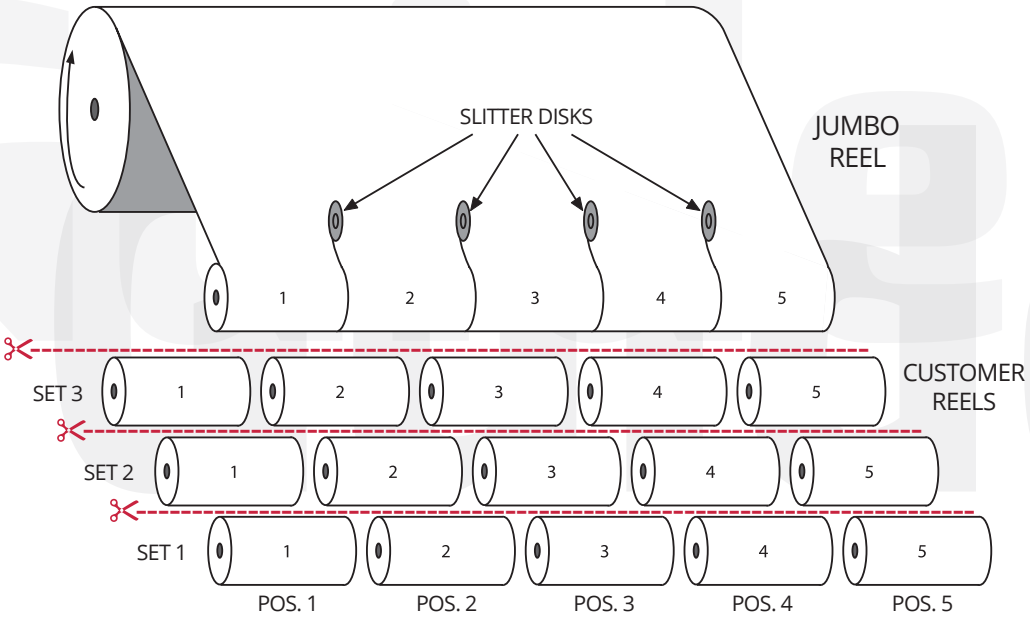
REEL NUMBERING

Reel numbering system varies between paper mills.
For details, contact your paper supplier.

A typical European example:

Customer reel number: 12345678

1 = paper machine
23 = week of production
456 = jumbo reel number
7 = set
8 = position



SunChemical®
a member of the DIC group

APPENDIX 2

SUN CHEMICAL TECHNICAL AUDIT PROGRAMME

The Technical Audit Programme was developed over many years from its origins in Technical Service and Trouble Shooting into its present day format. The traditional form of technical service was based on “firefighting” of printing problems, and whenever this situation arose we would send in a technician to resolve the problem.

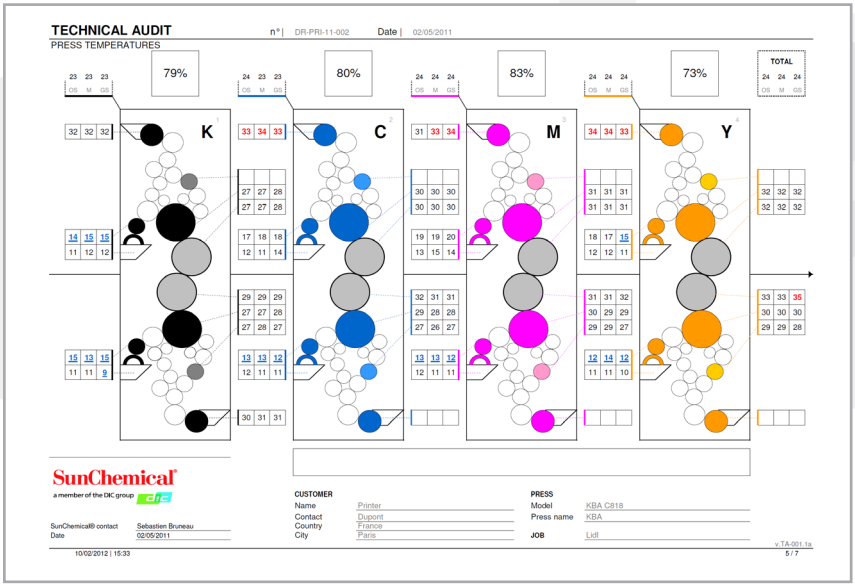
However we knew this would only ever be a short-term solution, and so we changed the emphasis to a philosophy of regular checks of the press physics and chemistry, and this was to be done even if everything was running without any problems, to find the press set up that gave the best performance. From these regular checks we have been able to provide a Press Profile, which would then give good running conditions and optimum performance for any specific web press model.

This programme is run every day in our organizations across Europe at many of our customers by specially trained and experienced technical persons who check the conditions on press. After the analysis, any corrective actions are recommended which need to be taken to improve the running conditions. The essence of this programme is to increase the profitability of the web printers by assisting them to improve productivity whilst reducing wastage and press downtime.

APPENDIX 2 (CONT.)

The Procedures for an audit requires the Sun Chemical technician to analyse the chemistry of the water and the fount solution additive for each press. This will include conductivity, temperature, pH, water hardness and clarity and the level of IPA if used. We also check the temperatures of the ink ducts, inking rollers, fount pans, plate and blankets on each unit top and bottom and right across the full width of the web press. Included in this is the paper web temperature in the dryer and also on the chills and as it travels through the folder. We are looking for any variations in temperature, higher or lower than normal temperature readings.

The results are recorded on a temperature audit form which is shared with the customer to compare and discuss the results. These forms are kept with the customer as a record of the running temperatures and press chemistry for future reference.



TECHNICAL AUDIT

n°| DR-PRI-11-002 Date | 02/05/2011

PRESS TEMPERATURES

79% 80% 83% 73% TOTAL

K C M Y

SunChemical

a member of the DIC group

SunChemical® contact Sebastien Bruneau

Date 02/05/2011

CUSTOMER

Name Printer

Contact Dupont

Country France

City Paris

PRESS

Model KBA C818

Press name KBA

JOB Lidl

10/02/2012 | 15:33

v TA-001.1a

5 / 7

SunChemical®
a member of the DIC group

APPENDIX 3

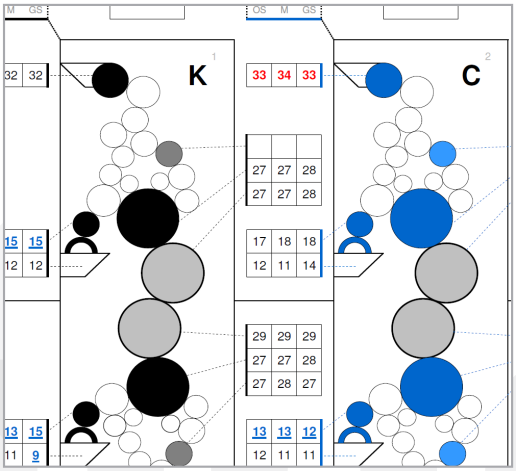
RECOMMENDED HEATSET TEMPERATURE GUIDE

Water Cooled Ink Vibrators - Surface Temperature

- Range is 28°C (± 2°C)
- Over 35°C increases ink tack due to faster solvent evaporation
- Under 22°C increases ink viscosity and reduces ink transfer

Fountain Solution Pan (Recirculating tank will need to be set lower to achieve these readings)

- Recommended pan temperature is 12°C - 15°C
- Higher temperatures increase evaporation
- Lower temperatures reduce ink transfer from the plate and may cause condensation



Sun Chemical Techical Audit

Dryers

- Recommended web temperature is 125°C - 140°C (this is the temperature in the dryer, not exit temperature)
- Set temperature control at minimum necessary to evaporate the solvents. Excessive heat reduces gloss, causes paper to crack and discolour

Chill Rolls

- Optimum ink setting is obtained by gradual reduction from one roll to the next

APPENDIX 3 (CONT.)

- Excessive heat removal by the first roll shocks the ink film and leads to marking
- Last roll web exit surface temperature below 20°C contributes to static electricity
- Temperatures above 30°C may cause marking

Cleaning/Maintenance Schedule for Fountain Solution Tanks & Press Pans

1. Drain system pans, lines and tanks. Refill with hot water
2. Add prepared fount system cleaner, and pump into pans to circulate
3. Continue flow of cleaning solution through system until you can see only discolouration of the solution, and no large particles evident
4. After system is clean, drain, flush with clean water, drain wipe out pans and tanks
5. Change all filters before refilling with fount solution
6. Before fount solution is pumped into pans, clean all damper rollers and etch chrome rollers
7. Cleaning and etching of rubber, chrome and ceramic rollers should be done as follows to desensitise roller surfaces

   a) Clean all rollers with a roller wash. Preferably clean rollers with a decalcifier
   b) Apply plate etch or scratch remover to rollers and let stand for 15 - 30 mins
   c) Gum rollers with gum arabic and let it set
   d) Let gum be removed as the system takes on water from the pan

To maintain optimum water receptivity repeat above procedure regularly.

SunChemical®
a member of the DIC group

(CONT.) APPENDIX 3

Recommended Conditions to Optimise Chill Roll Performance & Settings

- Water supply temperature to the first roll should not be below the dew point of the press room and air, the last chill roll exit temperature should not be below the dew point of the pressroom air or greater than 30°C

PERCENTAGE HEAT REMOVAL BY FIRST CHILL ROLL

No CHILL ROLLS	RECOMMENDED %	MAXIMUM %
3	57	67
4	40	50
5	30	40
6	23	33
9	15	22

- Conditions may be achieved by changing plumbing to a series configuration with water supply to a last roll counter current to web direction

BEST PRACTICES FOR STORAGE AND RUNNING TEMPERATURES

Ideal settings

- paper 23-25°C (storage)
- inks 23-25°C (storage)
- founts 10-15°C (running)
- rollers 26-30°C (set up)
- rollers 26-34°C (running)
- blankets 26-34°C (running)
- plates 26-34°C (running)
- air temp 25°C
- air humidity (50%-55% RH)

Keep records of settings and readings that you collected either by yourself or through Sun Chemical's Technical Audit Programme

APPENDIX 4

FOUNTAIN SOLUTION INFORMATION

FOUNTAIN SOLUTION – PRESS CHEMISTRY

Fountain Solution usually contains four basic components

1. Buffer; to stabilise the pH at 4.5-5.3, to keep the plate image area ink receptive and to keep the plate background water receptive
2. Wetting agents; lower water surface-tension to maintain wetting characteristics of plate non image areas
3. Plate Conditioners; to avoid plate corrosion during stop-over, extending plate life and improving print quality. Protects the plate non-image area from accepting ink and protects the plate from humidity and chemical attack during press stops
4. Substances to steer the emulsification process

The pH and conductivity of fountain solutions are vital to proper plate dampening

pH is a measure of the degree of acidity/alkalinity of the solution.

- It is vital to maintain stable pH at optimum level in order to reach high-quality, trouble free printing
- pH is not the main indicator for the fount dosing level (see conductivity). The pH will not give an indication of the fount dosage because the buffer in the solution holds the pH at the normal levels even as the fount dosage increases

Conductivity is the ability to conduct an electrical charge.

- The degree of solution's conductivity is based on the concentration of ions (originating from minerals or other compounds in the water)
- When added to a solution, alcohol with a conductivity reading of 0 reduces the overall conductivity of the solution
- Conductivity is the main measure for controlling the fount dosage. The conductivity increases linearly with the fount dosage

Summary

To control and measure the concentration level of the fountain solution, the use of a conductivity meter is the safest way to control the dosage within the recommended percentage.

SunChemical®
a member of the DIC group

(CONT.) APPENDIX 4

WHAT HAPPENS WHEN TOO MUCH CONCENTRATE IS USED IN THE FOUNTAIN SOLUTION?

- If the recommended dilution ratio of the fountain concentrate is 2% to 3 % this does not mean higher concentration levels will be better. Excessive use of fountain concentrate will cause problems and result in an unnecessary use of fountain chemistry
- When an overdose of a buffered fountain concentrate occurs, the pH reading will not indicate this excess because the buffering agent limits the pH of the solution
- A conductivity reading, on the other hand, will prove useful in determining excess amounts of fount solution

Problems that can occur when too much concentrate is used include:

a) ink emulsification, especially cyan and magenta
b) background tinting
c) poor ink receptivity, resulting in mottling and poor solid lay
d) premature plate wear from lack of ink lubrication
e) stripping on the ink rollers

For the best results, follow the recommended dosing rate provided by the manufacturer and find a range that works best for local conditions.

Summary

Excessive use of fountain concentrate will cause problems and increase the chemistry costs. A pH reading will not show up an overdose of fount concentrate. Accurate fount dosage should be measured by taking a sample from the Fount tank In-feed pipe and checking the conductivity

APPENDIX 4 (CONT.)

WHAT HAPPENS WHEN TOO LITTLE CONCENTRATE IS USED IN THE FOUNTAIN SOLUTION?

Insufficient fountain solution concentration can be determined by conductivity at the in-feed stage.

Problems that can occur when too little concentrate is used include:

a) Filling-in of reverse text
b) Scumming
c) Tinting
d) over-emulsification of inks
e) many active ingredients will be too weak to do their job:
- inadequate plate protection will leave the plate non-image area unprotected
- higher start-up waste
- without necessary amounts of fungicide, disruptive fungus growth may occur.

Summary

Follow recommended dosage of fount solution.
Stay within the pH and conductivity range most successful under your printing conditions.

SunChemical®
a member of the DIC group

APPENDIX 5

HEATSET INK MATRIX

- All Sun Chemical Heatset ink series are formulated to be universal for most paper types.
- All ink series are formulated for printing on all Heatset press types.
- All ink series are suitable for high speed printing.
- However, the final needs of ink also depends much on the job selection and your printing mix, so that the best is usually to refer to your local SunChemical representatives.
- Some specific paper types or finishing might require a special ink to ensure optimum rub resistance or finishing.

APPENDIX 6

COMMON MAINTENANCE RELATED FOLDER PROBLEMS

Superstructure draw (drag) rollers: Adjust trolleys so that they just touch the web (tears in the ribbons are caused by too high tension and a too low tension causes instability and leads to web wander).

Nip rollers: Ensure they are parallel with even pressure across web. When setting them place a second piece of the paper into the nip and pull it until it tears to determine correct pressure. Nip rollers should also be regularly checked for roundness.

Slitter: Poor cutting may result in a jam. Poor slitting will also result in excessive paper lint to clean away.

Former: Incorrect former angle leads to creasing and a higher risk for web break. Do not alter the manufacturer's setting – a worn or damaged former nose has the same effect.

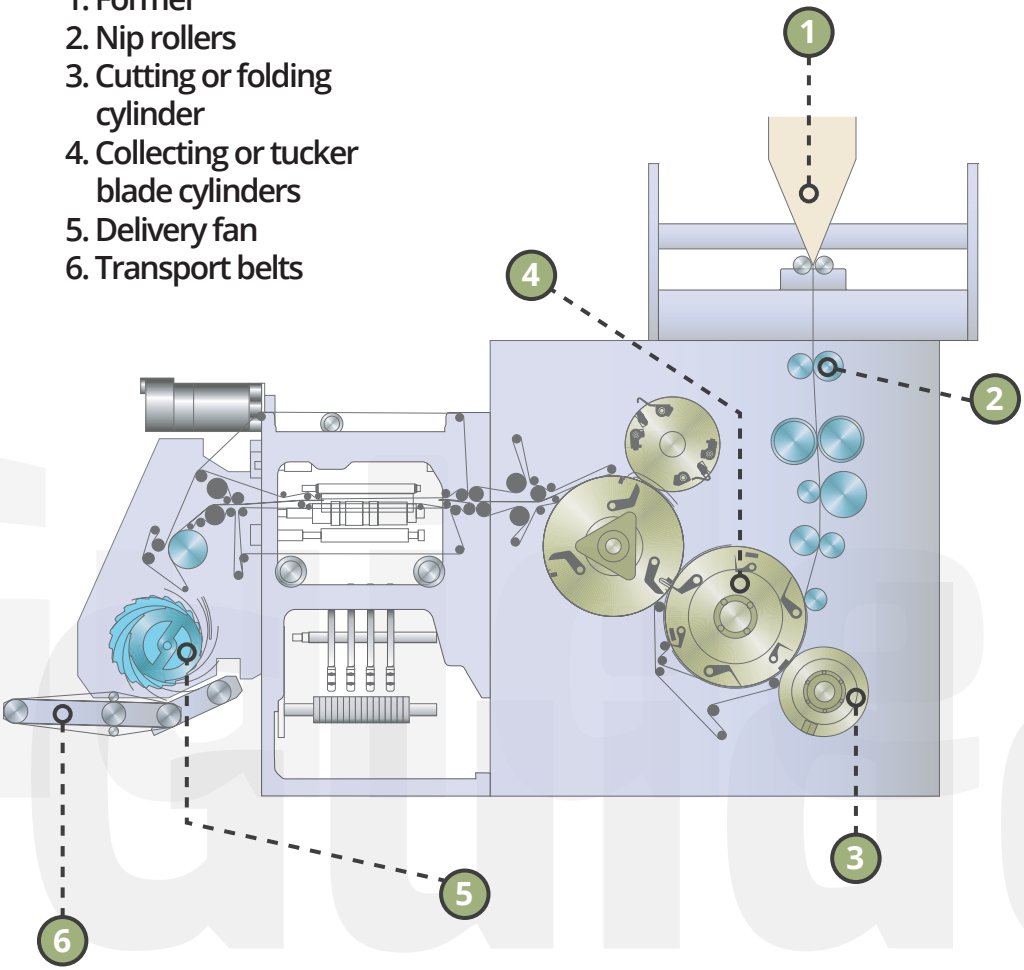
Turner bars: Incorrect angle can cause web wander. Use a marker pen to record correct settings on the bars.

Air pressure: Adjust pressure correctly at turner bars and former plates. Too high pressure leads to wandering; too low pressure causes ribbon creasing. (Modern presses are equipped with special coatings on the turner bars and no air is needed). If incoming air is too hot it can soften the ink and cause marking.

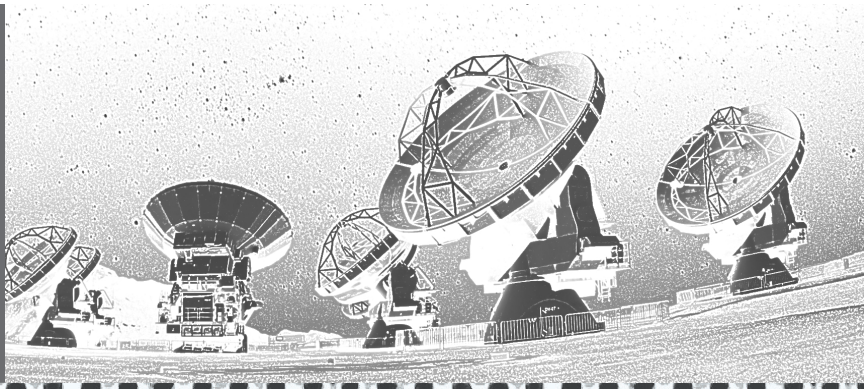
Chopper and cylinder folds: keep the pull roller springs clean and lubricated, ensure rollers do not become clogged with paper particles.

(CONT.) APPENDIX 6

1. Former
2. Nip rollers
3. Cutting or folding cylinder
4. Collecting or tucker blade cylinders
5. Delivery fan
6. Transport belts



DE ES FI FR **GB** IT PL RU SE



for Technical Assistance and/or more details about our products and services, please contact your Sun Chemical or Stora Enso local representatives

Sun Chemical Ltd
Wexham Springs
Framewood Rd.
Slough
SL3 6PJ
UNITED KINGDOM

Tel. +44 (0) 203 139 0000

www.sunchemical.com

Stora Enso Oyj Head Office
Kanavaranta 1
P.O. Box 309
FI-00101 Helsinki
FINLAND

Contact us here
https://info.storaenso.com/technical-resource-centre

www.storaenso.com

SunChemical®
a member of the DIC group

storaenso