

Publication Gravure Troubleshooting Guide

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Blocking

Problem: The top and bottom of the printed materials stick together when they are in contact in the stack.

Cause:

1. Press conditions
2. Ink film too thick
3. Improper resin selection in the ink formula

Solution:

1. Increase oven temperatures; make sure exhaust blowers are at maximum velocity; use spot air in heavily etched areas
2. Reduce viscosity of ink
3. Consult with ink manufacturer to reformulate with better solvent release or higher melting point resin

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Cell Plugging

Problem: Weak, non-uniform dots; differs from drying-in, as residue in cells does not resolubilize readily in toluene.

Cause:

1. Cells plugged with paper, paper coating and ink

Solution:

1. • Check paper coating integrity against control paper
• Increase ink fountain temperature
• Maintain ink fountain temperature above dew point at all times

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Color Hue Shift

Problem: Movement within register causes changes in color shade.

Cause:

1. Improper cell configurations on cylinders
2. Electric eyes may be out of alignment
3. Dryers may be too hot, causing the web to shrink
4. Poor register
5. Ink viscosity may be too high
6. Too much slip compound in the ink

Solution:

1. Check cell configuration; consult cylinder department
2. Adjust the electric eyes
3. Adjust heat level in dryers
4. Consult cylinder department
5. Lower ink viscosity by adding solvent
6. Add less slip compound to the ink or add fresh ink to fountain; consult ink manufacturer

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Color Too Strong

Problem: Visual color different from standard.

Cause:

1. Cell volume too great
2. Inappropriate cylinder etch or engraving
3. Nonabsorbent stock
4. Ink viscosity too high
5. Ink pigmentation too strong

Solution:

1. Lacquer in part of the cylinder to reduce cell volume
2. Consult cylinder department
3. Add solvent to reduce ink viscosity
4. Add only measured amount of solvent to correct running viscosity
5. Add clear or pigmented extender

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Color Variation

Problem: Inconsistent color reproduction.

Cause:

1. Lack of viscosity control
2. Automatic inker not adjusted. Solvent, ink and varnish flowing in at unequal rates
3. Inconsistent operator procedures
4. Variation in type and condition of equipment: cylinders, impression rollers, doctor blades
5. Changes in paper
6. Variations in ink batches

Solution:

1. Establish one set of procedures for all operators
Add only measured amounts of solvent to reduce ink to proper running viscosity
2. Check flow rates and equalize; calibrate flow rates
3. Establish one set of procedures
4. Eliminate or reduce variations in equipment between presses. Clean cylinders, rollers, doctor blades. Check durometer, reading of impression rollers; replace if necessary. Adjust viscosity for each print unit
5. Adjust ink viscosity to compensate for change, if possible; consult ink manufacturer for additional assistance
6. Inks may vary in strength; consult ink manufacturer

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Color Too Weak

Problem: Visual color different from standard.

Cause:

1. Worn cylinder
2. Too much solvent added when ink was reduced to press viscosity
3. Excess clean-up solvent in the system
4. Cylinder dirty - encrusted with ink
5. Doctor blade angle set incorrectly
6. Impression roller durometer too high
7. Very absorbent paper stock
8. Ink pigmentation weak
9. "Over extended"; too much extender on press

Solution:

1. Consult cylinder department; re-etch cylinder to increase cell volume. Decrease extender cuts; add toner if needed
2. Replace ink or add fresh ink to increase viscosity
3. Replace ink or add fresh ink to increase viscosity
4. Clean cylinder with brush and solvent to remove dried ink from cells; use brass bristle brush for chrome
5. Flatten angle to apply more ink
6. Consult roller manufacturer and replace if necessary
7. Run a higher viscosity, stronger ink and/or less extender in fountain
8. Add toners to ink or decrease extender cuts
9. Check auto ink batcher

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Cylinder Wear

Problem: Abrasive damage to the chrome surface of the cylinder.

Cause:

1. Bad chrome
2. Foreign particles lodged behind the doctor blade
3. Irregular cylinder surface
4. Parting shell
5. Doctor blade
6. Ink drying too fast
7. Ink abrasiveness
8. Paper or paper coating abrasiveness

Solution:

1. Check thickness, hardness, smoothness and ductility of chrome plating
2. Filter ink with at least a 25-micron filtering device and/or remove ink, adding fresh ink
3. Polish surface; re-cut and re-chrome cylinder; consult cylinder department
4. Have a new cylinder made; consult cylinder department
5. Check doctor blade pressure; check blade and angle for any unusual wear
6. Reduce drying rate of ink (See DRYING IN)
7. Have supplier re-check all raw materials in formula for abrasiveness
8. Check for contamination in fountain (paper coating, sludge, etc.); consult with paper supplier about changing paper

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Drying-in

Problem: Ink is drying in the cylinder cells.

Cause:

1. Press conditions

2. Ink drying too fast

Solution:

1. • Check air velocity and oven temperature
• Check angle of doctor blade
• Remove any spot air system that may be connected and causing drying-in
• Cool fountains
• Increase press speed
• Wipe or scrub cylinder

2. • Add slow drying solvent, such as xylene or naphtha
• Vehicle system can be changed
• Decrease viscosity
• Advise ink supplier of this condition
• Use solvent with more solubility

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Foaming

Problem: Frothing of the ink.

Cause:

1. Ink falls excessive distance when recycled into container
2. Too much air is being introduced into the ink
3. Air not being allowed to escape
4. Too much solvent added when ink was reduced to press viscosity
5. Improperly formulated ink

Solution:

1. Eliminate long fall by using hose or pipe to introduce ink into pan
2. Check for and repair leaky pump; adjust pump speed to reduce agitation; maintain ink level well above pump intake
3. Add solvent to ink to lower viscosity
4. Add fresh ink to increase viscosity
5. Add defoamer compound to ink; consult ink manufacturer

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Gloss (Too High or Too Low)

Problem: Improper reflective properties of the printed ink.

Cause:

1. Too high gloss

2. Too low gloss

Solution:

1.
 - Reduce viscosity by adding solvent.
 - Use a pigmented extender

2.
 - Add gloss extender, such as liquid resin or extender varnish
 - Increase viscosity by lowering the amount of solvent added to the virgin ink
 - Change reducing solvent to lower dilution ratio
 - Call ink supplier

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Inadequate Drying

Problem: Ink film remains wet or tacky to the touch.

Cause:

1. Dryer temperature too low for speed of web
2. Ink film does not dry at correct rate
3. Reducing solvent used has too slow drying rate
4. Poor solvent release properties of ink

Solution:

1. Increase dryer temperature to specification level; reduce web speed
2. • Adjust press speed and/or ink viscosity
• Consult with ink manufacturer
3. Use faster drying solvent such as lactol or textile spirits; avoid build-up of slow drying solvent (xylene)
4. Consult with ink manufacturer to reformulate in alternate vehicle

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Ink Settling

Problem: Separation of pigment from solution.

Cause:

1. Pump velocity in sump too low
2. Build-up in ink fountain
3. Previously used ink which has low viscosity
4. Old ink
5. Improper ink formulation

Solution:

1. • Check paper; replace if necessary
• Adjust viscosity
2. Increase circulation by adding drains or additional piping
3. Mix with fresh ink and use
4. Rotate inventory
5. Consult ink manufacturer

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Mottling, Puddling, Volcanoes

Problem: Random light and dark areas that give the printed area an uneven appearance.

Cause:

1. Non-uniform paper surface
2. Pattern in cylinder due to large cells
3. Improper pressure settings on impression roller
4. Ink film too thin
5. Ink improperly formulated

Solution:

1. Adjust viscosity
2. See cylinder department
3. Adjust impression roller
4. Replace ink or add fresh ink to increase viscosity (See COLOR WEAK)
5. Consult ink manufacturer

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Picking

Problem: Removal of part of paper surface or underlying ink film.

Cause:

1. Press conditions

2. Ink related

3. Paper related

Solution:

1. • Make sure ink fountain temperature is above dew point
• Reduce press speed
• Reduce impression roller pressure
• Make sure exhaust blowers are at maximum velocity
• Use spot air in heavily etched areas

2. • Adjust ink viscosities
• Add a faster drying solvent
• Change ink system for better solvent release

3. • Check surface strength of stock
• Consult with paper supplier

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Poor Ink Mileage

Problem: Excessive ink used per ton of paper stock.

Cause:

1. Excessive waste on start-up
2. Paper stock too absorbent
3. Improper ink and solvent blend
4. Ink penetrating into stock too fast
5. Different specific gravities of inks

Solution:

1. Improve start-up procedure
2. If possible, change to a less absorbent paper (See STRIKE-THROUGH)
3. Adjust to proper ink and solvent ratio to obtain prescribed viscosity
4. Consult with ink manufacturer to reformulate ink with more holdout
5. Consult your ink manufacturer for specific gravity values of inks

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Poor Printability

Problem: Lack of print quality due to various factors in the printing process.

Cause:

1. Press conditions
2. Paper
3. Ink properties

Solution:

1.
 - Check press speed
 - Check oven temperature
 - Check exhaust fans and spot air
 - Check ESA rollers
 - Check doctor blade and cylinder for wear
 - Check impression roller pressure
2.
 - Check for flaws in paper coating
 - Check for holes, slugs, or wrinkles
 - Check paper surface characteristics
3.
 - Change solvency to increase aromatics
 - Reduce ink viscosity with normal thinner
 - Reduce ink with higher boiling solvent or blend

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Poor Trapping

Problem: Succeeding layers of ink do not lay down properly.

Cause:

1. Ink viscosity too high
2. Base ink still wet
3. Underlying film being resoftened due to high aromatic content of diluting solvent
4. Underlying ink contains excessive wax compound
5. Silicones in underlying ink

Solution:

1. Reduce ink viscosity
2. • Adjust air velocity of drying condition around images
• Remove extra solvents
• Increase oven temperature and air velocity
• Increase ink drying speed with fast-drying solvent
3. Blend in non-aromatic solvent to reduce aromatic content of ink being trapped
4. • Add pigmented extender
• Reduce wax compound
• Add fresh ink
5. Have ink supplier remove silicone from ink

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Poor Wipe

Problem: Ink is not being removed from non-etched areas of the cylinder.

Cause:

1. Press conditions

2. Ink properties

Solution:

1.
 - Check doctor blade for nicks, flaws or excessive wear; rehone or replace if necessary
 - Check angle of doctor blade; adjust if necessary
 - Remove dirt or foreign matter from under doctor blade
 - Check railroads due to scratches in cylinder
 - Increase drying rate of ink; blow air between nip and blade
 - If scum occurs, polish cylinder and speed up drying rate
2.
 - Ink too highly pigmented; add clear extender varnish
 - Ink drying too fast or slow; slow down with xylene or speed up with lactol spirits
 - Check viscosity of ink; if high or low, adjust to prescribed viscosity

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Scuffing

Problem: Scratches in printed ink film due to poor rub resistance when abraded.

Cause:

1. Press conditions
2. Ink properties
3. Paper properties

Solution:

1.
 - Increase oven temperature or CFM
 - Adjust folder to improve slip
2.
 - Add hardeners or wax compounds to ink
 - Check ink viscosity; if low, adjust upwards
 - Change ink system's solvent release to upgrade ink film integrity
 - Notify ink supplier
3. Check abrasion of current stock versus standard; consult paper supplier

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Scumming

Problem: Ink deposits on the non-etched areas of the gravure cylinder.

Cause:

1. Doctor blade variables
2. Ink viscosity too high
3. Ink drying rate too slow on paper
4. Ink drying too slowly on cylinder
5. Cylinder surface too smooth
6. Ink formulation out of balance

Solution:

1. Improve blade edge finish; sharpen blade contact angle. Decrease blade thickness; increase blade pressure. Blade not parallel along length of cylinders allowing to scum on one side of cylinder
2. Reduce ink with the recommended solvent
3. Increase drying rate with faster drying solvent
4. Introduce local air drying; adjust point of wipe further away from point of impression to allow ink film to dry before transferring to web
5. Send cylinder to cylinder department for re-chroming and polishing
6. Consult with ink manufacturer

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Skipping

Problem: Cells fail to print out, causing speckles in printed materials.

Cause:

1. Indentations in paper
2. Cylinder conditions
3. Ink viscosity too high
4. Drying rate too fast (drying in cells)
5. Improperly formulated ink

Solution:

1. • Increase impression roller pressure; change to harder durometer roller
• Make sure ESA is on and at the proper polarity setting
• Change ESA roller
• Change paper
2. • Check screen angle
• Check chrome
• Check cell configuration
3. Check viscosity; reduce to correct level by adding measured amount of solvent
4. Increase press speed to reduce fountain temperature; consult with ink manufacturer to reformulate with higher boiling solvents
5. Consult ink manufacturer

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Strike-through

Problem: Excessive ink absorbing into paper stock and appearing on reverse side.

Cause:

1. Cylinder etch too deep
2. Paper too absorbent
3. Change in basis weight of paper
4. Insufficient ink hold-out

Solution:

1. • Lacquer cylinder
• Add pigmented extender
• Increase ink viscosity
• Increase oven temperature and air velocity
2. If possible, change to a less absorbent paper or increase ink viscosity
3. Revert to original basis weight
4. Consult with ink manufacturer to reformulate ink for more holdout

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Whiskering

Problem: Hairy edges of printed areas.

Cause:

1. Paper
2. Press conditions
3. Ink properties

Solution:

1. Remove static from web with tinsel, humidity or other static eliminators
2. • Change conductivity of impression roller
• Decrease cylinder cell volume
• Decrease doctor blade pressure
• Reverse polarity of ESA unit
• Reduce press speeds
• Extend oven hood close to nip
3. • Increase ink viscosity
• Steam web before and after problem unit

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