

Web Offset Heatset Troubleshooting Guide

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Blistering

Symptom: Moisture explosions in the paper cause bubbles to form.

Cause:

1. Oven heat too high
2. Excess dwell time in oven
3. Paper has excessive moisture, improper density or base
4. Ink pigmentation too low

Solution:

1. Reduce oven temperature; consult ink manufacturer for inks compatible with lower temperatures
2. Adjust press speed, web dwell time in dryer and chill roll temperature to optimum levels
3. Run roll from different paper machine position. Consult paper manufacturer; change stock if necessary
4. Consult ink manufacturer to adjust pigment strength

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Blocking

Symptom: Undesired adhesion between printed materials.

Cause:

1. Ink dries too slowly
2. Improper silicone applicator setting
3. Excessive pressure on log or in stack

Solution:

1. See DRYING
2. Check concentration and reduce film thickness
3. Reduce strap pressure or reduce stack height

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Color Variation

Symptom: Inconsistent color reproduction between proof and print.

Cause:

1. Variation between proof and printing substrates
2. Special, spot color does not match proof
3. Excessive heat causes too much penetration of ink resin, poor gloss

Solution:

1. Adjust ink film thickness to that of proof; consult substrate manufacturer for stock more similar to proof stock; consult ink manufacturer for ink with hue and hold-out adjusted for current paper
2. Consult ink manufacturer
3. Reduce drier temperature; increase press speed

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Dot Gain – On Press

Symptom: Printed halftones appear muddy, show higher values than proof.

Cause:

1. Improper pressure settings between plates, blankets and roller
2. Doubled or slurred dots
3. Ink viscosity too low
4. Ink too water-receptive
5. Plate not sharp enough
6. Ink color strength too low

Solution:

1. Adjust to proper pressure settings
2. Adjust plate-to-blanket pressure; check for and correct blanket and roller slippage; assure mechanical stability at high speeds
3. Consult ink manufacturer
4. Consult ink manufacturer
5. Coordinate with prepress for sharper halftones, negatives, positives and plates
6. Consult ink manufacturer

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Dot Gain – Prepress

Symptom: Dot gain occurs during prepress reproduction.

Cause:

Film

1. Dots on film too soft; too much fringe
2. Dot percentages on the film inaccurate

Plate

1. Negative plates over-exposed
2. Poor contact between film and plate in vacuum frame
3. Improper lamp spectral intensity (aged lamps)
4. Plate is underdeveloped or has insufficient support next to brushes
5. Incorrect digital plate curve being applied for paper/ink combination

Solution:

Film

1. Check films for halos or veiled dots; increase the output resolution on image setters
2. Measure the films to determine accuracy; if necessary, recalibrate image setters

Plate

1. Use a plate control target and plate reading instrument to evaluate the plates; cut back on plate exposures
2. Check vacuum gauge (25-27psi); look for clogged hoses, worn areas and/or leaks
3. Change the vacuum frame lamps, track and record usage of time on lamps
4. Check developer chemistry and brush support/contact
5. Apply correct curve to plate

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Drying

Symptom: Ink film tacky during press delivery and binding, resulting in setoff or marking.

Cause:

1. Dryer temperature too low for press speed; insufficient solvent release from ink
2. Ink film too thick
3. Insufficient evacuation of solvent vapors from web as it leaves dryer
4. Chill roll too warm; ink resins failing to set adequately
5. Paper contains excessive water; non-porous stock
6. Improper fountain solution pH/conductivity
7. Ink taking up too much water
8. Uneven plate dampening
9. Ink film only dries on surface, trapping solvents
10. Ink films do not dry at normal temperatures

Solution:

1. Increase dryer temperature or reduce press speed
2. Adjust press setting to carry less ink; consult ink manufacturer
3. Increase velocity of air in air knife scavenger at dryer exit
4. Reduce chill roll temperature while avoiding condensation
5. Change stock
6. Adjust fountain solution to proper pH/conductivity
7. Adjust to proper ink/water balance; consult ink manufacturer
8. Clean dampeners thoroughly; check windows, vents and forced air systems to prevent drafts
9. Adjust oven temperature; reduce press speed
10. Consult ink manufacturer

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Gloss

Symptom: Ink has improper reflective properties.

Cause:

1. Stock too absorbent; paper surface too rough/grainy
2. Press dampeners: inking system contains excessive water
3. Ink film too thin
4. Dryer temperature too high
5. Excessive ink vehicle penetration into stock

Solution:

1. Change to smoother, nonabsorbent stock with more ink hold-out; consult paper manufacturer
2. Reduce amount of fountain solution; consult ink manufacturer for more water-resistant ink
3. Increase ink film thickness
4. Reduce press speed to allow lower oven temperature; consult ink manufacturer to reformulate ink
5. Reduce dryer temperature and maintain sufficient chilling capacity; increase press speed to reduce oven dwell time; consult ink manufacturer for ink with more hold-out

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Hickies

Symptom: Donut-shaped or irregularly shaped white spots on printed surface.

Cause:

1. Dried ink particles
2. Roller particles
3. Glazed roller
4. Foreign particles
5. Loose paper coatings or dust

Solution:

1. Clean press thoroughly and regularly; remove dried ink from fountain and roller ends
2. Replace rollers if necessary
3. Use specially formulated glaze-removing materials or scrub roller with pumice and solvent
4. Improve housekeeping: a) check air systems for circulation of dust; b) vacuum surface of overhead fixtures such as lights; c) hang plastic sheeting over press
5. Consult paper manufacturer to install vacuum sheet cleaner

NOTE: Properly maintained “hickie-picker” rollers do work. All require frequent scrubbing for optimum performance.

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Ink / Water Balance

Symptom: Frequent adjustments required on press to maintain print quality.

Cause:

1. Excessive or insufficient fountain solution
2. Improper concentration of fountain solution
3. Improper dampening roller setting
4. Improper ink form roller settings
5. Improper ink fountain settings
6. Ink too weak
7. Ink taking up too much water

Solution:

1. Adjust dampener settings to proper levels
2. Adjust fountain solution to proper pH/conductivity
3. Reset rollers: insure that dampener rollers are driven by vibrator roller and not plate
4. Conduct ink stripe test to check form roller pressure; adjust if necessary
5. Adjust ink at fountain to proper level; allow adequate time for adjustment to take effect
6. Consult ink manufacturer
7. Adjust ink/water balance; consult ink manufacturer

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Marking

Symptom: Streaks, tracks or smudges on web due to mechanical contact.

Cause:

1. Grater roller points too dull
2. Web bustle wheels touch image areas
3. Improper air flow
4. Chill roll too warm
5. Web temperature too low to drive off solvents
6. Press speed or job type beyond dryer capabilities
7. Non-absorbent stock
8. Ink film too thick

Solution:

1. Install grater roller with sharper points
2. Move wheels so they touch only non-image areas; apply TEFLON® tape to make wheels less abrasive
3. Adjust airflow through oven; adjust web tension
4. Reduce temperature for post-chill roll temperature of 90° F or less; recommended temperature is 72-75° F. CAUTION: If chill rolls are too cold, condensation can occur. Reduce oven temperature to minimum necessary to get web through chilling and press folding operation
5. For impingement dryer, adjust flame tips to impinge properly; for velocity forced air dryer, raise air temperature; decrease press speed; increase air circulation; consult ink manufacturer for faster drying ink. CAUTION: Paper will burn at 451° F and can scorch at lower temperatures
6. Consult dryer manufacturer
7. Consult paper manufacturer; change stock
8. Reduce ink film; raise air temperature in dryer; reduce press speed to increase oven dwell time; consult ink manufacturer for faster drying ink

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Misting / Slinging

Symptom: Excessive amount of ink being thrown from ink train rollers.

Cause:

1. Excessive ink on rollers
2. Improper ink/water balance
3. Improperly set or worn rollers
4. Roller train too hot
5. Ink too long in body

Solution:

1. Adjust press to carry less ink; consult ink manufacturer for stronger ink
2. Adjust to proper ink/water balance
3. Adjust roller to appropriate settings; replace if necessary
4. Reduce temperature or increase flow of cooling water through rollers
5. Consult ink manufacturer

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Mottle

Symptom: Solids areas not uniform, resulting in uneven appearance.

Cause:

1. Non-uniform stock surface
2. Improperly set or worn ink form rollers
3. Excessive linting
4. Printing pressure too high
5. Worn blanket
6. Improper ink/water balance
7. Poor ink transfer

Solution:

1. Consult paper manufacturer to change stock; consult ink manufacturer for ink with less penetration
2. Adjust rollers to proper settings; replace if necessary
3. See PICKING/LINTING
4. Reduce printing pressure
5. Replace blanket
6. Adjust to proper ink/water balance
7. Consult ink manufacturer

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Picking / Linting

Symptom: Picking: Lifting of the coating from coated stocks onto plates, blankets and/or ink train rollers. **Linting:** Accumulation of fibers from uncoated stocks onto plates, blankets and/or ink train rollers.

Cause:

1. Too much water reaching paper
2. Improper concentration of fountain solution
3. Excessive lint, surface trash, coating dust on stock
4. Base stock picks
5. Improperly packed cylinders: pressure too high for ink/stock combination
6. Blanket too tacky
7. Ink too tacky for stock

Solution:

1. Adjust to proper ink/water balance
2. Adjust fountain solution to proper pH/conductivity
3. Make tape pulls from blanket; consult paper manufacturer
4. Reject stock if necessary; change to more lint- or pick-resistant stock
5. Adjust press; repack to manufacturer specifications
6. Consult blanket manufacturer; change blanket wash, treat blanket or change to less tacky blanket
7. Consult ink manufacturer to reduce ink tack

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Piling

Symptom: Build-up of ink on printing plates.

Cause:

1. Paper problems
2. Improperly packed cylinders
3. Improperly set or worn rollers
4. Ink is waterlogged
5. Ink drying too fast

Solution:

1. See PICKING/LINTING
2. Check specifications and adjust cylinders
3. Check specifications and adjust rollers; replace if necessary
4. Adjust dampener settings; consult ink manufacturer
5. Consult ink manufacturer to adjust tack and stability

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Plate Blinding – Chemical

Symptom: Part or all of image on plate does not take ink.
(See *Plate Blinding – Mechanical*)

Cause:

1. Fountain solution too acidic
2. Excessive gum in fountain solution
3. Plate cleaners and/or scratch removers have dried on plate image
4. Fountain system contaminated by detergent
5. Excessive fountain solution in ink
6. Improperly developed plates; gum adheres to image area

Solution:

1. Adjust fountain solution to proper pH/conductivity
2. Re-etch plates and rub up image areas with press ink; drain fountain solution and fill with tap water; if image returns, replace tap water with fountain solution containing less gum
3. Rinse plate thoroughly and immediately after using these materials
4. Thoroughly rinse all parts in contact with detergent before re-installing in press
5. Reduce dampener setting to minimum level; consult ink manufacturer
6. Wash plate thoroughly; remake if necessary

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Plate Blinding – Mechanical

Symptom: Part or all of image on plate does not take ink.
(See *Plate Blinding – Chemical*)

Cause:

1. Excessive linting
2. Excessive plate-to-blanket pressure
3. Improperly set ink and dampening form rollers
4. Abrasive particles destroying images

Solution:

1. See PICKING/LINTING
2. Use pressure gauge to check pressure; adjust to proper level
3. Check setting and durometer; adjust or replace
4. Check ink grind, fountain solution, solvents, etc.; replace contaminated materials

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Poor Mileage

Symptom: Too few impressions per pound of ink.

Cause:

1. Lack of control of ink densities
2. Ink penetrates stock too quickly
3. Improper ink/water balance
4. Low pigmented inks
5. Excessive waste on start-up
6. Improper estimates from job to job

Solution:

1. Adjust to lower print densities while maintaining acceptable quality
2. Consult ink manufacturer for ink with more holdout; use less porous stock
3. Adjust to proper ink/water balance
4. Consult ink manufacturer to reformulate ink with more strength
5. Improve start-up procedures
6. Establish ink history and consistent procedure to improve estimates

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Register – Running Direction

Symptom: After the press has been set for proper registration, misregistration occurs in running direction.

Cause:

1. One or more plates are improperly set on cylinders
2. One or more plates are printing longer or shorter than others
3. Uneven blanket packing; web tension will build up until the web snaps back
4. Web tension too low
5. Web tension changes during run because infeed tension changes
6. Ink tack at point of impression too high, causing web to follow blanket; can increase tension in localized areas
7. Paper pile on blanket changes blanket diameter
8. Paper roll out of round or has flat areas

Solution:

1. Handle plates more carefully on bending jig
2. Transfer packing from blanket to plate to shorten printing, or from plate to blanket to lengthen printing; maintain good web tension
3. Adjust blanket packing until draws between units are equal
4. Increase web tension in infeed section of press
5. Equip press with constant tension infeed
6. Increase web tension; reduce press speed; consult ink manufacturer for ink tack reduction
7. Wash blanket more frequently; change to more moisture-resistant paper
8. Use constant-tension infeed; increase distance between infeed and first printing unit; change to roll without problem

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Register – Side-to-Side Direction

Symptom: After the press has been set for proper registration, misregistration occurs laterally.

Cause:

1. Non-uniform moisture content across web causes corrugation of roll
2. Welts caused by rolls unwrapped in high humidity and allowed to stand. Welts occur not more than 25 mils into roll and can cause side-to-side misregister just after splicing
3. Paper varies in caliper across the web
4. Web has slack edges due to moisture pick-up while in the roll
5. Ink tack too high at point of impression

Solution:

1. Increase distance between infeed and first printing unit; use preheater on infeed and first printing unit to dry paper, even moisture content and flatten web; equip press with curved roller to spread and flatten web
2. Remove outer 25 mils of paper; do not unwrap rolls until just before going to press
3. Consult paper manufacturer
4. Keep rolls protected from atmospheric changes until they are mounted on the infeed stand; increase distance between infeed and first printing unit; increase web tension to tighten slack edges; equip press with curved roller on infeed to spread and flatten web; adjust the eccentric mounted infeed roller to balance edge tension
5. Consult ink manufacturer

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Roller Stripping

Symptom: Rollers do not accept ink.

Cause:

1. Fountain solution too acidic
2. Excess water on press
3. Desensitized metal vibrator rollers
4. Glazed form roller
5. Excessive emulsification of ink
6. Improperly set rollers
7. Ink too strong
8. Ink too water-resistant

Solution:

1. Adjust fountain solution to proper pH/conductivity
2. Reduce dampener settings
3. Clean copperized rollers; ink rollers and wash again; use less gum in fountain solution
4. Remove rollers from press, de-glaze appropriately and rinse well
5. Reduce dampener settings; consult ink and dampening solution manufacturers
6. Adjust rollers to proper setting
7. Consult ink manufacturer
8. Consult ink manufacturer

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Rub-Off / Scuffing

Symptom: Printed ink appears dry, but exhibits poor resistance when abraded.

Cause:

1. Improper ink/water balance
2. Paper contains too much water
3. Excessive ink
4. Improper pH of fountain solution
5. Improperly formulated ink
6. Rough paper surface creates poor rub between unprinted and printed surfaces
7. Ink dries too slowly
8. Poor paper coating integrity

Solution:

1. Adjust to proper ink/water balance
2. Change paper
3. Adjust press to carry less ink; reduce print density
4. Adjust fountain solution to proper pH/conductivity
5. Consult ink manufacturer to reformulate ink with more binding vehicle or rub resistance
6. Consult paper manufacturer for more absorbent stock; consult ink manufacturer to reformulate ink with more rub resistance
7. See DRYING
8. Consult paper manufacturer

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Scumming

Symptom: Non-image area of lithographic plate accepts ink in random areas.

Cause:

1. Plate improperly processed or exposed to light
2. Low alcohol (or alcohol substitute) content in dampening system
3. Improper ink/water balance
4. Excessive printing pressure
5. Glazed blanket, ink rollers or dampening rollers
6. Ink rollers overheated
7. Improper ink tack/viscosity ratio

Solution:

1. Desensitize or remake plate; adjust plate-making process
2. Adjust fountain solution concentration to proper level
3. Adjust to proper ink/water balance
4. Reduce printing pressure to proper levels
5. Clean blanket and rollers thoroughly and recondition per manufacturer specifications
6. Check for worn bearings and replace if necessary; adjust ink rollers to proper pressure
7. Consult ink manufacturer

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Tinting / Toning

Symptom: Emulsified ink transferred to printed sheets as background tint.

Cause:

1. Ink bleeds into fountain solution
2. Improper concentration of fountain solution
3. Pressure between plate and blanket too high
4. Improper setting of dampener or ink rollers
5. Ink insufficiently resistant to water
6. Improperly exposed or developed plates
7. Improper ink/water balance
8. Paper chemicals contaminate ink train
9. Prolonged use of detergent or clean up solution

Solution:

1. Adjust concentration of alcohol or alcohol substitute in fountain solution; consult ink manufacturer
2. Adjust fountain solution to proper pH/conductivity
3. Adjust pressure to manufacturer specifications
4. Adjust dampener/ink rollers to manufacturer specifications
5. Consult ink manufacturer to reformulate ink with greater water resistance
6. Replace plates if necessary; adjust plate-making process
7. Adjust to proper ink/water balance
8. Use low-tack ink, low water setting and low pressure setting; change paper
9. Remove detergent with water or petroleum solvent and change solution

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Trapping

Symptom: Cannot achieve good color balance or overall appearance.

Cause:

1. Tack of inks out of sequence
2. Improperly balanced ink strength
3. Unequal press stability of inks; succeeding inks tack up more quickly than preceding inks
4. Additive in ink creates film, preventing subsequent inks from adhering
5. Improper ink/water balance
6. Poor ink release from blanket
7. Improper register

Solution:

1. Adjust inks to have progressively lower tack
2. Adjust inks to have progressively heavier film for optimum traps
3. Consult ink manufacturer
4. Consult ink manufacturer
5. Adjust to proper ink/water balance. See MOTTLE
6. Consult blanket manufacturer; consult ink manufacturer
7. See REGISTER

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Web Breaks – Paper

Symptom: Web routinely tears as it passes through press.
(See *Web Breaks – Press, Inks*)

Cause:

1. Excessive tension on edge(s) of web due to loss of moisture and shrinkage
2. Roll has dent or cut at end
3. Fiber cuts, hair cuts, wire holes, wrinkles, slime spots, foam spots, etc.
4. Bad mill splices

Solution:

1. Keep rolls completely and carefully wrapped until mounted on press
2. Sand or cut paper until edge is smooth, if possible; otherwise remove damaged portion of roll and replace; consult paper manufacturer
3. Consult paper manufacturer if defects are common
4. Consult paper mill if defects are common

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Web Breaks – Press, Inks

Symptom: Web routinely tears as it passes through press.
(See *Web Breaks – Paper*)

Cause:

Press

1. Web tension too high
2. Printing units or press elements out of line (often indicated by diagonal wrinkles in web)
3. Improper blanket pressures

Ink

4. Ink too tacky
5. Ink body may be too long causing drips from fountain nip to web
6. Ink pigment too weak, causing ink fountain key to be opened and allowing ink to drip
7. Ink misting/slinging

Solution:

Press

1. Reduce web tension
2. Check and adjust press alignment
3. Adjust blanket packing to manufacturer specifications

Ink

4. Consult ink manufacturer to reformulate ink with less tack
5. Consult ink manufacturer to reformulate ink
6. Consult ink manufacturer
7. See MISTING / SLINGING

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