

Flexography Troubleshooting Guide

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Adhesion

Problem: Ink flakes off substrate, comes off when crinkled, or is removed easily in tape test.

Cause:

1. Viscosity too high
2. Viscosity too low
3. Ink surface tension too high
4. Incorrect ink system for substrate
5. Poor film treatment
6. Ink drying too slow
7. Substrate surface contamination
8. Insufficient web temperature

Solution:

1. Reduce viscosity consistent with acceptable printability
2. Add virgin ink to fountain
3. Consult your technical sales representative
4. Ensure that the correct ink for the substrate is being used
5. Check surface of film for adequate treatment; treat in-line, if possible
6. Check driers for heat and airflow; consult your ink manufacturer
Solvent Flexo: Reduce with faster solvent blend
7. Check with film supplier as to advisability of applying a primer before printing, use in-line treater
8. Increase temperature settings of driers, check drier balance

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Bleed

Problem: Color spreads into subsequently applied coating or adhesive.

Cause:

1. Improper pigment use in ink formulation
2. Coating or adhesive may be rewetting the dried ink

Solution:

1. Consult your ink manufacturer to reformulate using resistant pigment
2. Consult your ink manufacturer to reformulate using resistant pigment

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Blushing (Hazing, Fogging)

Problem: Milky, foggy or matte appearance in an ink or coating.

Cause:

1. **Solvent Flexo:** High humidity causing excess moisture build-up in ink
2. **Solvent Flexo:** Moisture condensation on surface of drying ink

Solution:

1. **Solvent Flexo:** Consult your ink manufacturer for properly balanced solvent blend for specific ink and printing conditions
2. **Solvent Flexo:** Use less hygroscopic solvent blend for ink reduction; coordinate with your ink manufacturer

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Color Too Strong

Problem: Visual color different from standard.

Cause:

1. **Solvent Flexo:** Ink viscosity too high

Water Flexo: Ink pH too high

2. Ink pigmentation too high

3. Inappropriate anilox roll; cell volume too great or cell count too low

4. Inadequate pressure setting on impression roll

5. Plate and/or ink metering roll durometer too low

6. Inadequate impression on doctor blade

Solution:

1. **Solvent Flexo:** Reduce viscosity to proper level with recommended solvent blend

Water Flexo: Check and adjust pH then reduce viscosity to proper level

2. Reduce ink colorant strength with balanced extender

3. Replace anilox roller with one of higher line count and/or lower volume capacity

4. Adjust impression for optimum printability

5. Consult plate and/or roller manufacturer

6. Adjust doctor blade to recommended pressure

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Color Variations Among Same Color Jobs Being Run in a Plant

Cause:

1. Poor viscosity control
Water Flexo: Lack of pH control
2. Variation in substrate porosity or surface treatment
3. Previously used ink
4. Inadequate amount of ink in fountain or doctor blade chamber
5. Different suppliers of same color
6. Variation in ink batches
7. Non-standard process design

Solution:

1. Establish set procedures for viscosity control
Water Flexo: Maintain proper pH
2. Consult with ink and substrate manufacturers for proper measures to be taken
3. Replace or add virgin ink
4. Add ink to fountain or ensure adequate ink pressure into enclosed doctor blade assembly
5. Run only one supplier's ink on a given color
6. Consult your ink manufacturer
7. Inks must be modified to matched print station; recommend match visual standard on-site

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Dirty Printing

Problem: Fuzzy extensions of image into non-image area. Impression increase or change in plate durometer during run. Recovers when taken off press; sometimes results in cracks in plate during storage.

Cause:

1. Excess ink being applied to plate
2. Excess impression between plate and substrate
3. Ink viscosity too high
4. Accumulation of paper dust (lint)
5. Ink drying too fast
6. **Water Flexo:** Ink pH too low
7. Excessive anilox volume
8. Excess anilox impression
9. Plate swell caused by use of materials not compatible with printing plates

Solution:

1. Adjust anilox/fountain roller impression; adjust doctor blade pressure
2. Reduce to “kiss” impression for type and minimize impression consistent with acceptable printability for reverses
3. Adjust to lowest viscosity consistent with acceptable printability
4. Improve housekeeping, vacuum paper dust and filter ink
5. Check air flow at between-deck driers; consult your technical service representative
- Solvent Flexo:** Use slower solvent blend to reduce ink
6. **Water Flexo:** Raise pH as instructed to by ink manufacturer
7. Use lower volume anilox
8. Back off impression of anilox to plate
9. Confer with plate and ink suppliers

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Excessive Ink Consumption

Problem: Too few impressions per pound of ink.

Cause:

1. Ink viscosity too high
2. Ink color acceptable, but stronger than standard
3. Weak ink
4. Excessive anilox volume
5. 2 Roll: Soft metering roller
6. Excess loss on start up or shutdown

Solution:

1. Reduce ink to lowest viscosity consistent with acceptable printability
2. Use balanced extender to weaken color to the middle of the acceptable range
3. Check ink for strength vs. original standard
4. Finer/shallower anilox
5. Check durometer; extend or reduce ink
6. Additional care in ink handling; can be due to large amount of ink required for inking station

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Fill-in of Reverses and Type

Problem: Ink bridges across small print and non-printing gaps in design.

Cause:

1. Excess ink being applied to plate
2. Excess impression between plate and substrate
3. Ink viscosity too high
4. Accumulation of paper dust (lint)
5. Ink drying too fast

6. **Water Flexo:** Ink pH too low
7. Excessive anilox volume

Solution:

1. Adjust anilox/fountain roller impression; adjust doctor blade pressure
2. Reduce to “kiss” impression for type and minimize impression consistent with acceptable printability for reverses
3. Adjust to lowest viscosity consistent with acceptable printability
4. Improve housekeeping, vacuum paper dust and filter ink
5. Check air flow at between-deck driers. Consult your ink manufacturer

Solvent Flexo: Use slower solvent blend to reduce ink

6. **Water Flexo:** Raise pH as instructed by ink manufacturer
7. Use lower volume anilox

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Float on Ink

Problem: Non uniform layer on surface of ink in container may result in a variety of print defects as container is used.

Cause:

1. Non-compatible additive that is less dense than ink

Solution:

1. Mix and keep mixing while using. Agitation in sump may be required in severe cases

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NOTE: All inks should be mixed before use as a general practice.

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Foaming

Problem: Voids in printing, foam visible in sumps, or ink overflowing sump.

Cause:

1. Too much air being introduced into ink
2. Ink level in fountain below pump intake level
3. Ink falls excessive distance when recycled into reservoir
4. Ink viscosity too high
5. Improperly formulated ink
6. **Water Flexo:** Poor cleanup procedures

Solution:

1. Check for leaks in hoses and pumps. Adjust pump speed to reduce agitation
2. Fill fountain with ink well above intake level
3. Use hose or pipe to eliminate long ink falls into pan
4. Reduce viscosity to allow any bubbles to rise and break at surface
5. Consult your ink manufacturer
6. **Water Flexo:** Ensure that no detergent from clean-up has contaminated ink

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Ghosting

Problem: Part of image not printing; resembles an offset of same image. (See also *Tracking*)

Cause:

1. Ink dries too fast for anilox volume, does not adequately replenish anilox

Solution:

1.
 - Slow ink down
 - Add extender
 - Use coarser anilox
 - Reduce press speed

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Halo Around Print

Problem: Area just inside of printed image with light or no ink; often accompanied by dirty printing.

Cause:

1. Improper pressure settings on impression

Solution:

1. Adjust to as close to “kiss” impression as possible, consistent with acceptable printability

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Kick-out

Problem: Coagulated ink, lumps or particles in ink.

Cause:

1. **Solvent Flexo:** Incorrect solvent balance during viscosity reduction
2. **Solvent Flexo:** High humidity causing excess moisture build-up in ink
3. **Water Flexo:** Drop in pH.
4. Mixing incompatible inks

Solution:

1. **Solvent Flexo:** Consult with your ink manufacturer for properly balanced solvent blend for specific ink and printing conditions
2. **Solvent Flexo:** Use less hygroscopic solvent blend for ink reduction. Coordinate this with your ink manufacturer
3. **Water Flexo:** Adjust pH to proper level with amine solution. Consult your ink manufacturer
4. Do not mix inks from different vendors or water inks with solvent inks

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Mottle

Problem: Random light and dark spots. May cause color to appear dirty.

Cause:

1. Substrate has non-uniform caliper or absorption characteristics
2. Ink viscosity too low
3. Improper impression. Can be caused by uneven plates, surface dirt on plates or dirty impression cylinder
4. Non-optimal plate selection
5. Contaminated plates
6. Transparent color

Solution:

1. Try lower durometer plate; try opaque ink
2. Add fresh ink and maintain proper viscosity
3. Clean plates and impression cylinder; adjust impression; check and adjust plate cushion or mounting materials; remake plates
4. Consult plate manufacturer
5. Wash plates with appropriate solvent or replace plate if cannot be cleaned
6. Transparent color does not cause problem, but increasing opacity of the color match may mask the problem

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Pinholes or Fisheyes

Problem: Tiny round voids in printed image. Sometimes confused with screening.

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Cause:

1. Ink drying too fast
2. Low or uneven treatment level on film
3. Excessive foam
4. **Solvent Flexo:** Contaminated film surface

Solution:

1. Check air flow at between-deck driers; consult your ink manufacturer
2. Check film treatment; re-treat or treat in-line if possible
3. See FOAMING
4. **Solvent Flexo:** Check with film supplier about applying a wash coat before printing; replace with roll of film from different lot

NOTE: Pinholes generally pertain to unwetted substrates. Fisheyes are areas where ink has pulled back, leaving uninked or light areas.

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Pinholes or Fisheyes, continued

Problem: Tiny round voids in printed image. Sometimes confused with screening.

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Cause:

5. **Solvent Flexo:** Contamination from poor clean-up of fountain, rollers, etc.
6. **Solvent Flexo:** Excess “slip agent” in ink
7. **Solvent Flexo:** Incorrect ink for substrate being printed
8. **Water Flexo:** Excessive defoamer in ink
9. **Water Flexo:** Ink surface tension too high

Solution:

5. **Solvent Flexo:** Empty fountain, properly dispose of contaminated ink, clean fountain and all rollers properly, and start job with fresh ink
6. **Solvent Flexo:** Clean up as described in number 5 above and start up with ink from a different lot; consult your ink manufacturer
7. **Solvent Flexo:** Consult your ink manufacturer
8. **Water Flexo:** Add fresh ink to fountain or replace all ink in fountain with fresh ink
9. **Water Flexo:** Consult your ink manufacturer for recommendation

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Screening

Problem: Small voids printed in image area. Often has very regular shape consistent with anilox pattern.

Cause:

1. Ink drying too fast on anilox roll
2. Inadequate inking of anilox (starvation)
3. Similar appearance can be caused by plates or backing

Solution:

1. Consult ink manufacturer
Solvent Flexo: Reduce with slower solvent blend
2. Slow down press, increase ink flow, or slow return to increase ink level in fountain
3. Consult ink manufacturer or plate manufacturer

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Set-off and/or Blocking

Problem: Ink transfers from image side to back side of substrate when unrolled; inability to separate printed sheets or to unroll web.

Cause:

1. Drying too slow
2. Excess pressure in re-wound roll
3. Film substrate treated on both sides
4. Film substrate heavily plasticized
5. Web too warm when rewind
6. Web rewind with too much surface moisture
7. **Solvent Flexo:** Trapped solvent in printed ink film
8. **Water Flexo:** Trapped amine in printed ink film

Solution:

1. Check driers for heat and air flow; reduce ink viscosity consistent with acceptable printability; consult your ink manufacturer
2. Reduce rewind tension
3. Avoid excessive pressure in rewind; apply offset powder to web prior to rewind; overprint with non-blocking clear varnish, if necessary
4. Avoid excessive pressure in rewind; apply offset powder to web prior to rewind; overprint with non-blocking clear varnish; consult your ink manufacturer for different ink
5. Reduce web temperature by chilling within 10° F of ambient temperature
6. Avoid over chilling which allows condensation to form on film surface
7. **Solvent Flexo:** Check driers for heat and airflow; consult your ink manufacturer
8. **Water Flexo:** Check driers for heat and airflow; consult your ink manufacturer

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Settling of Ink

Problem: Thick or particulate material in bottom of sumps, pans or ink containers.

Cause:

1. Old ink
2. Press return at lower viscosity
3. Improper ink formulation
4. Some specialty inks may settle due to the high specific gravity of the pigment.

Solution:

1. Rotate inventory
2. Mix, then combine with virgin ink prior to use
3. Consult your ink manufacturer
4. Add agitation to the ink sump

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Sheet Feeding Problem

Problem: Slipping in delivery belts causing frequent jams in subsequent operations or on sheetfed presses.

Cause:

1. Ink build-up on delivery belt
2. Worn belts
3. Mechanical problems

4. Inappropriate ink formulation

Solution:

1. Clean belts
2. Replace belts
3. Ensure all tensions, pressures and other mechanical adjustments are correct
4. Consult your ink manufacturer

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Smearing

Problem: Ink smeared into non-image area by surface contact down-line on the printing press.

Cause:

1. Too much ink
2. Too little drying
3. Rewetting by adhesive or coating
4. Mechanical speed mismatch

Solution:

1. Use a lower volume anilox, increase nip pressure (2 roll), lower viscosity
2. Increase dry capacity, slow down press, use faster reducer
3. Change ink, coating reducer or formulation
4. Adjust combination of plate, mounting tape and gearing

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Striations

Problem: Lines of weak ink or no ink in direction of print run.

Cause:

1. Ink film too thin due to worn or plugged anilox roller, high durometer plate or too-low viscosity
2. Improper pressure setting on impression cylinder and/or anilox roller due to uneven plates or substrate
3. Defects in anilox, plate or fountain roll
4. Ink too transparent

Solution:

1. Clean or replace anilox roller; remake plate; check and adjust pH and viscosity
2. Adjust impression to as near “kiss” as possible.
3. Replace or repair defective component; investigate cause to avoid recurrence
4. Transparent color does not cause problem, but increasing opacity of the color match may mask the problem

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Tracking

Problem: Ink appears in area where there is no print.
(See *Ghosting*)

Cause:

1. Ink film too heavy
2. Ink drying too slow
3. Mechanical problems
4. Difficult design due to extreme color coverage, degree of trapping and/or die cut positioning

Solution:

1. Reduce viscosity consistent with acceptable color and printability; have ink reformulated for stronger color to permit thinner film; adjust to proper pressure at all roller nips
2. **Solvent Flexo:** Adjust ink drying speed with supplier-recommended solvent blend
Water Flexo: Adjust ink drying speed based on instructions from supplier
3. Adjust and clean all belt and idler roller surfaces that are in contact with the printed substrate
4. Change layout of design and/or consult your ink manufacturer

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Trapping

Problem: Cannot achieve good coverage in areas where more than one color is applied.

Cause:

1. First-down color drying too slow
2. Subsequent colors drying too fast
3. Improper pressure setting on impression cylinder
4. **Water Flexo:** Improper viscosity
5. Incorrect plate or backing

Solution:

1. Consult your ink manufacturer; check drier capacity; **Solvent Flexo:** Use faster-drying reducing solvent
2. Check air flow in between-color driers. Consult your ink manufacturer; **Solvent Flexo:** Use slower drying reducing solvent
3. Adjust impression on first- and second-down inks
4. **Water Flexo:** In general, each succeeding color requires slightly higher viscosity; adjust accordingly
5. Use optimal plate, firmer backing

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Weak Color

Problem: Visual color different from standard.

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Cause:

1. Ink viscosity too low

Solvent/Water Flexo:

- a. Too much solvent added to cut ink
- b. Excess clean-up solvent in system

Water Flexo: pH too low

2. Worn anilox roller
3. Plugged anilox roller
4. Plate durometer too high

Solution:

1. Replace ink totally or add virgin ink to fountain
2. Consult anilox roller manufacturer to verify; replace if necessary
3. Use brass bristled brush for chrome rollers; stainless steel bristled brush for ceramic rollers
Solvent Flexo: Clean with recommended solvent to remove dry ink from cells
Water Flexo: Clean with brush, hot water (140° F) and detergent to remove dry ink from cells
4. Remake plates to proper specifications and replace

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Weak Color, continued

Problem: Visual color different from standard.

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Cause:

5. Improper pressure setting on impression and/or anilox roller
6. Ink too weak for anilox roller volume
7. Inadequate ink in fountain or in doctor blade chamber
8. **Solvent Flexo:** Dirty plates
9. **Water Flexo:** Glazed or dirty plates
10. **Water Flexo:** Glazed metering roll

Solution:

5. Re-adjust impression for optimum printability
6. Consult your ink manufacturer to strengthen ink if at all possible. If this is not possible, replace anilox roller with one having a deeper etch
7. Add ink to fountain or ensure adequate ink pressure into enclosed doctor blade assembly
8. **Solvent Flexo:** Wash plates with recommended solvent and, if necessary, a moderately stiff non-metallic brush
9. **Water Flexo:** Wash plates with warm water, a mild detergent and a moderately stiff non-metallic brush
10. **Water Flexo:** Wash with warm water, a mild detergent and a moderately stiff non-metallic brush

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