

nVC norcross viscosity controls

WHEN CONSISTENCY MATTERS

Flexographic Troubleshooting Guide



IMPROVING INK FLOW FOR ACCURATE IMPRESSIONS

In the modern Flexographic industry, you work hard to improve the quality of your printing. You're under increased pressure to maximize productivity, decrease waste and run efficiently to increase the bottom line. Your customers rely on your expertise in ink handling and maintenance in order to maintain the highest quality of the printed product. You experience a number of issues that keep you from reaching these goals.

This guide will help you identify the source of your difficulties and will provide solutions to help you solve your printing problems.



CONTENTS

Introduction	4
Adhesion	5
Bleeding or smearing	6
Blushing (Hazing, Fogging)	6
Color too strong	7
Color variations between presses (same job)	8
Dirty Printing	9
Excessive Ink Consumption	10
Fill In	11
Float/ Film on ink	11
Foaming	12
Ghosting/ Tracking	12
Halo, light image and/or dirty image	13
Kick-out	13
Mottle	14
Pinholes/ Fisheyes	15
Screening	16
Set-off or Blocking	16
Settling of Ink	17
Smearing	17
Striations	18
Tracking	18
Trapping	19
Weak Color	20
Our Company	21

INTRODUCTION

As the demands of their customers change, Flexographic printers are under increased pressure to improve productivity, decrease waste, run efficiently and maintain a profitable bottom line.



Flexographic printers historically have always been on the cutting edge of technology:

Incorporating newer, faster presses, more reliable and durable components and consumables and state-of-the-art control systems, all in an effort to improve the quality of their printed products while maintaining costs necessary to bring the product to market. Despite taking these steps, Flexographic printers still experience a number of print-related

issues that are keeping them from reaching their cost and quality goals. This troubleshooting guide, compiled by a number of different suppliers and manufacturers to the Flexographic print industry, is designed to help you identify the cause and provide a solution to problems experienced by printers every day. It is not intended to be a “how to fix” guide, rather a template you can use to recognize and resolve print related issues before they get out of hand.

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; if possible treat in line
6. Check driers for heat and airflow; consult your ink manufacturer or reduce with faster solvent blends
7. Apply primer before printing, use in-line treater
8. Increase temperature settings of driers, check drier balance

Bleeding or Smearing

Problem: Color spreads into subsequently applied coating or adhesive.

CAUSE

1. Improper Pigment Use
2. Coating or adhesive may be rewetting ink
3. Ink viscosity too high
4. Incorrect solvent formulation

SOLUTION

1. Reformulate ink, consult with ink supplier
2. Reformulate ink, consult with ink supplier
3. Reduce viscosity or film thickness
4. Use faster or slower drying solvents

Blushing (Hazing, Fogging)

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

CAUSE

1. High humidity causing excessive moisture in ink
2. Condensation on surface of drying ink

SOLUTION

1. Check solvent blend for ink and plant conditions
2. Ensure solvent blend is appropriate for existing conditions

Solvent blend should be appropriate for existing conditions.

Color Too Strong

Problem: Actual printed color does not match standard.

CAUSE

1. Viscosity too high (Solvent-based inks)
 2. pH too high (Water-based inks)
 3. Ink pigmentation too high
4. Anilox roll cell volume too great or cell count too low for application
 5. Pressure roller setting inadequate
6. Plate or ink metering roll durometer (hardness) too low for job
7. Inadequate doctor blade impression

SOLUTION

1. Reduce viscosity consistent with acceptable printability
2. Check & adjust pH, reduce viscosity to acceptable level
3. Reduce colorant strength with extender
4. Replace with higher line count or lower volume anilox roller
5. Adjust impression to improve print
6. Consult your plate or roll manufacturer
7. Adjust doctor blade to recommended pressure

pH adjustment can sometimes fix overly strong colors.

Color Variations Between Presses (same job)

Problem: Actual printed color does not match standard.

CAUSE

1. Improper viscosity measuring and/ or control (Solvent-based inks)
2. Improper pH measuring and or control (Water-based inks)
3. Old or previously used ink
4. Inadequate ink in chamber or fountain
5. Same color inks from different supplier
6. Variations in ink batches

SOLUTION

1. Verify established viscosity control standards are in place and in use. (Viscosity cups are standardized plant wide; automatic control equipment is calibrated to inks on each job)
2. Verify established pH measuring standards are in place and in use. (Hand-held pH testers are routinely calibrated plant wide; automatic pH control equipment is calibrated to inks on each job)
3. Replace or add virgin ink (recheck viscosity and/or pH)
4. Ensure adequate ink flow, and ink pressure in enclosed doctor blade chamber
5. Ensure jobs are run with the same supplier's ink
6. Ensure ink is up to date, check with ink supplier

Replace your ink and get a better idea of where the problem is.

Dirty Printing

Problem: Printed image in non-printing area.

CAUSE

1. Excessive ink applied to plate
2. Excessive plate and substrate impression
3. Ink viscosity too high
4. Ink drying too fast
5. Poor film treatment
6. Ink drying too slow
7. Substrate surface contamination
8. Insufficient web temperature

SOLUTION

1. Adjust anilox roller impression and/or doctor blade pressure
2. Reduce “kiss” impression
3. Adjust viscosity to meet job specifications
4. Check drier air flow
5. Check surface of film for adequate treatment; if possible treat in line
6. Check driers for heat and airflow; consult your ink manufacturer. Reduce with faster solvent blends
7. Apply primer before printing, use in-line treater
8. Increase temperature settings of driers, check drier balance

Excessive Ink Consumption

Problem: Less impressions per ink volume.

CAUSE

1. Viscosity too high
2. Ink color too strong
3. Weak/old Ink
4. Excessive anilox volume
5. Metering roll too soft for job
6. Ink loss on startup or shutdown

SOLUTION

1. Reduce viscosity
2. Use extender to weaken color to acceptable level
3. Check ink to original standard, check date and usage. Consult your ink supplier
4. Replace with appropriate anilox
5. Check metering roll durometer, reduce ink
6. Review ink handling setup & shutdown procedures

Always keep an eye on the age and quality of your ink.

Fill In

Problem: Ink bridges across small print & non image areas.

CAUSE

1. Excessive ink applied to plate
2. Excessive plate/ substrate pressure
3. Ink viscosity too high
4. Ink contamination from paper or lint
5. Ink drying too fast (Solvent)
6. Ink pH too low (Water-based)
7. Excessive anilox volume

SOLUTION

1. Adjust anilox roller impression and/or doctor blade pressure
2. Reduce “kiss” impression to acceptable print quality
3. Reduce ink viscosity to acceptable print quality
4. Filter ink in process, set up housekeeping appropriate for the environment
5. Check drier air flow, check solvent blend
6. Adjust pH to accept level
7. Use lower volume anilox roller

Float/Film on Ink

Problem: Ink separated or contaminated.

CAUSE

1. Old or dirty ink
2. Incompatible ink additive
3. Improper mixing

SOLUTION

1. Check ink chemistry, check with make ready/ ink tech; replace ink with fresh supply
2. Check with ink supplier/tech
3. Ensure ink is mixed and agitated

Foaming

Problem: Foam visible in ink pail or pump, missing print areas.

CAUSE

1. Ink exposed to too much air
2. Ink fountain level too low
3. Ink return too long for job
4. Ink viscosity too high
5. Ink not correct/appropriate for job
6. Poor cleanup/ink contamination

SOLUTION

1. Check pump speed & for leaks in ink lines
2. Ensure ink fountain is filling properly
3. Reduce return line distance
4. Ensure viscosity is reduced to allow entrained air to escape
5. Check ink supplier or make ready ink tech
6. Ensure housekeeping/cleanup procedures are being followed

Ghosting/Tracking

Problem: Printed image duplicated, or part of printed area missing.

CAUSE

1. Ink dries too fast
2. Anilox line screen too fine
3. Press speed too fast for job

SOLUTION

1. Check solvent compatibility
2. Use lower line screen roller
3. Reduce press speed

Problems with ghosting? Try slowing down your press.

Halo, Light Image and / or Dirty Image

Problem: Printed image light or devoid of ink, residual dirty image.

CAUSE

1. Improper impression setting

SOLUTION

1. Adjust “kiss” impression to acceptable level

Kick-Out

Problem: Clumps or particles in ink, out of suspension.

CAUSE

1. Ink/ solvent ratio incorrect
2. Excessive moisture buildup
3. pH too low (Water-based)
4. Mixing incompatible inks
5. Inadequate mixing
6. Housekeeping

SOLUTION

1. Check solvent for ink compatibility
2. Check solvent for ink compatibility
3. Adjust pH to proper level
4. Ensure unlike inks are not being mixed together
5. Ensure ink in pail is properly mixed
6. Ensure cleaning procedures are being followed

To prevent clumping or excess particles, keep an eye on your solvent and ink compatibility.

Mottle

Problem: Intermittent light & dark print; dirty color.

CAUSE

1. Substrate absorption or caliper not correct
2. Viscosity too low
3. Improper impression
4. Dirt or contaminated plate surface or impression roller
5. Improper plate for job

SOLUTION

1. Try lower durometer plate or inks
2. Add virgin ink and maintain viscosity
3. Ensure “kiss” is adequate for print job
4. Ensure plates and impression roller cleaned prior to job
5. Ensure proper plate material and durometer

Pinholes/Fisheyes

Problem: Round voids in printed area

- Pinholes generally pertain to unwetted substrates
- Fisheyes are areas where ink has pulled back, leaving non-inked or light areas

CAUSE

1. Ink drying too fast for job
2. Uneven or low film treatment
3. Excessive foam
4. Contaminated film surface
5. Ink contamination
6. Ink incorrect for substrate
7. Excessive ink defoamer (Water-based)
8. Ink surface tension too high

SOLUTION

1. Check drier air flow
2. Check and retreat film as necessary
3. Check pump and mixer speed, ink formulation
4. Apply wash coat prior to printing or replace film roll
5. Ensure that ink lines, chamber and rollers properly cleaned
6. Check with ink and film supplier
7. Add or replace ink with fresh supply
8. Check with ink supplier

Screening

Problem: Anilox cell-shaped voids on print surface.

CAUSE

1. Ink drying too fast on anilox roller
2. Ink starvation at anilox roller
3. Issues with plate

SOLUTION

1. Check solvent blend
2. Increase ink flow, ink fountain is filling properly, reduce press speed
3. Check plate for defects

Set-off 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. Excessive re-wind roll pressure
3. Film improperly treated
4. Web too hot on rewind
5. Too much surface moisture on rewind
6. Solvent trapped in printed film
7. Trapped amine in printed film

SOLUTION

1. Check driers for flow, reduce viscosity to meet job specifications
2. Reduce rewind tension
3. Check film for compatibility
4. Avoid excessive pressure on rewind, reduce web temperature
5. Avoid over-chilling on rewind
6. Check driers for appropriate air flow
7. Check driers for appropriate air flow

Settling of Ink

Problem: Pigment separation.

CAUSE

1. Old or contaminated ink
2. Ink viscosity too low on return
3. Improper ink formulation
4. High pigment specific gravity
5. Inadequate mixing

SOLUTION

1. Replace ink or rotate inventory
2. Check ink viscosity, add ink
3. Check ink/ solvent ratio and formulation
4. Ensure inks are being properly mixed
5. Ensure ink in pail is properly mixed

Smearing

Problem: Ink smeared into non-image areas.

CAUSE

1. Too much ink application
2. Drying too slow, too little
3. Rewetting by coating or adhesive
4. Press component mismatch

SOLUTION

1. Employ lower volume anilox roller, decrease viscosity
2. Increase drier capacity, slow down press, check solvent blend
3. Change to appropriate ink, coating or adhesive formulation
4. Adjust plate mounting, tape and press gearing to match

Prevent smearing with a faster drying process.

Striations

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

CAUSE

1. Ink film too thin
2. Plate durometer too high
3. Viscosity too low
4. Improper pressure setting on impression cylinder or anilox roller
5. Uneven plate setting
6. Defects in plate, anilox, doctor blade

SOLUTION

1. Check and clean plugged anilox roller
2. Check and/or remake plate
3. Adjust viscosity to proper level
4. Adjust impression to desired “kiss” setting
5. Check plate for proper position and adhesion
6. Check all components for wear, contamination or damage

Tracking

Problem: Ink in non-image area.

CAUSE

1. Ink dries too fast/ too slow
2. Anilox line screen too fine
3. Press speed too fast for job
4. Ink film too heavy
5. Mechanical or press problems

SOLUTION

1. Check solvent compatibility
2. Use lower line screen roller
3. Reduce press speed
4. Adjust viscosity to acceptable level or reformulate ink
5. Adjust all components that are in contact with the printed film

Trapping

Problem: Inadequate coverage on multi-color image areas (multi-station & color runs).

CAUSE

1. First down color drying slow
2. Subsequent colors drying too fast
3. Improper impression roller pressure
4. Viscosity too high or low (Water-based)
5. Incorrect plate or backing
6. Housekeeping

SOLUTION

1. Ensure solvent formulation is correct for the ink used and/or check drier capacity
2. Check air flow between driers and/ or solvent formulation
3. Adjust impression on 1st & 2nd down inks
4. Each successive color should have slightly higher viscosity
5. Ensure ink in pail is properly mixed
6. Ensure plate is correct, firm and secure

Too much air flow can mean colors dry too fast.

Weak Color

Problem: Printed color not same as standard.

CAUSE

1. Ink viscosity too low
2. Ink pH too low (Water-based)
3. Worn anilox roller
4. Plugged anilox roller (Solvent- based)
5. Plugged anilox roller (Water-based)
6. Plate durometer too high
7. Improper impression setting
8. Ink too weak
9. Inadequate ink in chamber or fountain
10. Dirty plates (Solvent-based)
11. Dirty plates (Water-based)
12. Glazed metering roll

SOLUTION

1. Adjust viscosity to acceptable level or check solvent formulation
2. Adjust pH to acceptable level or check amine formulation
3. Check and replace anilox roller (check manufacturer)
4. Clean with recommended solvent to remove dry ink from cells
5. Clean with hot water and recommended detergent to remove dry ink from cells
6. Remake or replace plates
7. Readjust Impression for best print image
8. Adjust ink to fit anilox cell volume
9. Ensure proper ink flow in process, check ink
10. Wash & brush plates with recommended
11. Wash & brush plates with warm water & detergent
12. Wash & brush with warm water & detergent recommended

Strong colors come from clean, even press components.

OUR COMPANY

Norcross has been in business for over 75 years, helping Flexographic printers like yours solve their printing problems. Norcross provides a wide range of viscometers, controllers and accessories, along with technical expertise, technical advice and troubleshooting to help you increase your bottom line.

Need Assistance with your Viscosity Issues?

Contact us for a free consultation, or find out what sorts of custom solutions we offer.

CLICK FOR A CONSULTATION >



DOWNLOAD OUR VISCOSITY CONVERSION TABLE ↓

Make accurate conversions between different units of viscosity.



Norcross Viscosity Controls

12427 31 Mile Road, Washington, Michigan 48095, +1 (617) 969-7020

www.viscosity.com