Transfer Pad Printing

Troubleshooting Guide

Complete Pad Printing Solutions
www.itwtranstech.com

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Dear Valued Customer:

This troubleshooting guide is intended to answer the basic questions that many of our customers frequently ask us about pad printing. Because so many factors contribute to a successful pad printing operation, it is sometimes difficult to solve unusual problems with simple, easy answers. However, our test print lab technicians have many years of experience with unique applications as well as basic "how to" issues of pad printing.
If your particular situation requires special help, feel free to call us for further information at our TOLL-FREE Service Phone: ***866.356.2041 or "Contact Us" at our website: www.itwtranstech.com***

With best regards,

ITW Trans Tech
An Illinois Tool Works Company

PROBLEM:
Pad is not picking up the whole print.

	Cause	Solution
Ink	Ink is too thick.	Add thinner.
	Ink is thin enough, but still drying too fast - this problem occurs with very fine line art.	Use slower thinner or retarder.
Pad	Pad is too new or too oily.	Clean with pad cleaner and print on paper, approx. 30 prints.
	Pad is too flat.	Use a pad with a sharper angle.
	Print is falling on tip of pad.	Move image off tip of pad or select different style pad.
Cliché (plate)	Using metallic ink in a screened image (pigment caught in screen).	Use a non-screened cliché or run ink extra thin.
	Too shallow etch depth of cliché.	Make same cliché with deeper etch.
Other	Doctor blade is dipping into large image and is wiping out some ink.	1. Decrease blade pressure 2. Use a more rigid blade material 3. Skew the print image to eliminate long horizontal areas parallel to doctor blade 4. Use a cliché with a screened image.

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ITW Trans Tech has the experienced pad printing experts to answer your questions.
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PROBLEM:
Pad is not releasing entire print onto part.

Pretest: determine if ink is wet or dry on pad - immediately after pad prints part, wipe pad with finger. (See note on page three.)

	Cause	Solution
Ink	Ink dried on pad (flaky) rolls up on pad.	1. Use slower thinner or retarder. 2. Speed up machine. 3. Run ink thinner.
	Ink wet on pad (smears on finger).	1. Run ink thicker. 2. Use faster thinner. 3. Blow air on pad. 4. Slow down machine.
Pad	Pad is too old or dried out.	1. Coat pad with Long Life Oil (#141112) overnight. 2. Use new or newer pad.
Material (part)	Surface contaminated (grease, oil, sweaty hands or mold release).	1. Pre-clean parts. 2. Wash hands or wear gloves.
Cliché (plate)	Etch depth is too deep; ink is wet on pad.	Make new cliché with shallower etch.
	Etch depth is too shallow; ink is dry on pad.	Take same cliché and give it a deeper etch.
Other	Room temperature is too high. Check if ink is dry on pad.	Ideal temperature is 68° F.
	Room humidity is too high. Check if ink is wet on pad.	Ideal humidity is 40 to 60%.
	High air circulation in room. Check if ink is dry on pad.	Reduce circulation.

PROBLEM:
Insufficient gloss of print.

	Cause	Solution
Ink	Ink is wrong type.	Use a gloss ink not a matte ink.
	Ink is attacking fragile materials.	Test, using less aggressive ink.
	Not enough ink transfer; check if etch depth is too shallow.	Double hit part.
Cliché (plate)	Cliché depth is too shallow.	Take same cliché; make etch deeper.
	Image is screened.	Try an open etched cliché if possible.

Note:
The two basic principles of ink consistency are:
1. Ink must be "wet" enough to pick onto the pad but not overly thinned.
2. Ink must be "dry" enough to release fully onto the part but not overly dry.

The only purpose thinner serves in the ink is to slow down the drying of the ink in order to get it onto the pad. To control this drying or "flashing off" of the thinner, a pad blower may be used.

A pad blower (#141017) may be used to dry or tack the ink on the pad if the machine has a fast cycle, if the ink is slow drying or over-thinned or to keep the ink from smearing if being applied to an angled part. Remember to point the pad blower at the pad and not around the ink well or ink cup.

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PROBLEM:
Printed image is patchy; appears uneven.

	Cause	Solution
Ink	Too much thinner added to ink.	Adjust viscosity of ink.
	Wrong type of printing ink used.	Use transfer pad printing ink for best results.
	Print is transparent. Note: transparent ink dries slower due to less pigmentation	1. Double hit part. 2. Use stronger pigment ink.
Pad	Pad is wrong shape (too flat).	Use a pad with a sharper angle of descent.
	Pad is too soft.	Use harder pad.
	Pad is too old or dried out. Ink is not releasing.	1. Coat pad with Long Life Oil (# 141112) overnight. 2. Use a new or newer pad.
Cliché (plate)	Uneven depth in etch.	Remake cliché to the proper tolerance.
	Etch depth is too shallow or too deep.	Remake cliché to standard depth.
	Shallow spot appears in plastic cliché.	Remake cliché - if problem continues, check the screen and the film.
Material (part)	Too much texture appears on part.	Use a hard pad with a steep angle.
	Part surface is dirty or contaminated.	Clean part and/or wear gloves.
	Part is translucent.	Double hit part.
	Part is dark.	Preprint a white background.
Other	Doctor blade is dipping into a large image and wiping out some of the ink.	1. Decrease doctor blade pressure. 2. Use a more rigid doctor blade. 3. Skew the print image to eliminate long horizontal areas, parallel to doctor blade. 4. Use a cliché with a screened image.

PROBLEM:
Color does not match original master part.

	Cause	Solution
Ink	Ink is too thin (print looks washed out).	Adjust viscosity of ink.
	Ink is cured at high temperature (burned).	Try a lower temperature for a longer time.
	Note: Make sure ink is releasing from pad. See "pad is not releasing entire print onto part" on page 4.	
Cliché (plate)	Cliché has wrong etch depth.	Check depth and remake cliché if necessary.
	Wrong etch method is used; screened or solid etch.	Color matcher must know method and depth of etch before formulating.
Material (part)	Color of substrate is bleeding through print.	1. Double hit parts. 2. Print a white background.
	Translucent parts show light bleeding through.	1. Double or triple hit the parts. 2. Print a white background.
	Color of substrate has changed from original color match.	Rematch new color.

Note: When having a color match done, the technician must know the following:

1. What type of ink is being used?
2. Are parts being single or double hit?
3. What is the color of the substrate that is being printed?
   (If substrate is not black or white, a sample part must be submitted.)
4. Screened or solid type of cliché etch?
5. Depth of etch? How many microns?
6. Is the image going to be printed on a radius, therefore stretching or compressing the ink?

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PROBLEM:
Poor adhesion of ink to product.

Note: This problem occurs often because the substrate is not known. Try to first identify the substrate, then select the correct ink.

	Cause	Solution
Ink	Ink is wrong type.	Perform ink tests and try various different types of inks.
	Wrong hardener or lack of hardener was used with a two component ink.	Mix ink with correct hardener.
	Incorrect mixing ratio was used.	Use correct ratio of ink to hardener by weight.
Material (part)	Surface of part is contaminated with mold release.	Clean part prior to printing.
dyne	Surface tension of part is too low. Common substrates are polypropylene, polyethylene and acetal.	Pretreat parts to increase surface tension to at least 44 dyne, TTA # T500XX (XX = level of solution).
Curing	Not enough heat applied to the part.	Use a higher temperature or heat for longer.
	Not enough curing time used.	Part must sit for 1-5 days before fully cured.
	Too much heat was used. Plastisol or flame retardant is bleeding through.	Use a lower temperature and heat for longer.

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PROBLEM:
Small trappings of air are visible (pinholes).

	Cause	Solution
Ink	Ink is too thick.	Add thinner to ink.
	Ink has jelly-like consistency; doesn't flow.	Add Flow Agent FX 32 (# 1205001).
Cliché (plate)	Etch is too deep.	Remake plate with proper etch depth.
	Cliché has the wrong style of etch for the application.	When using a flat or a soft pad, the cliché should be screened.
Pad	Pad has a cut or holes in pad.	Reposition or replace the pad.
	Pad is too flat.	Use a pad with a sharper angle.
	Pad is contaminated.	Clean pad with pad cleaner (# 1411121) or clear tape.
Material (parts)	Parts are contaminated with dust.	Clean parts.
	Parts have texture.	Use a hard pad with a sharp angle. It may be necessary to dry ink on pad to bridge texture.
Other	Film is not clean.	Clean the film before making temporary clichés with Anti-Static Film Cleaner - (# 1411134).
	Pinholes show in film positive.	retouch image on positive; then make a new cliché.

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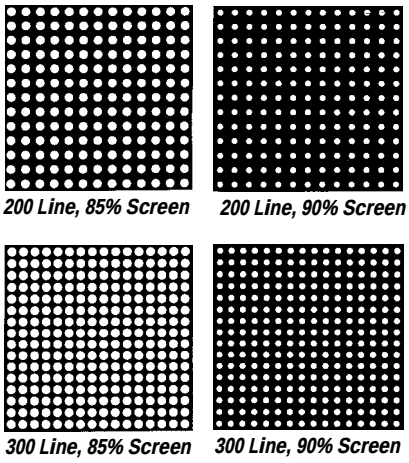
PROBLEM:
Screen dots are visible.

	Cause	Solution
Ink	Ink is too thick	Add thinner.
	Thinner is too fast.	Use slower thinner.
Pad	Angle is too sharp.	Use a flatter pad.
	Pad is too soft.	Use a harder pad.
Cliché (plate)	Etch is too shallow.	Use same cliché; re-etch deeper.
	Wrong screen used. Finest screen with steel cliché is 150 line. Finest screen with plastic cliché is 300 line.	The finer the screen, the less visible the dots become.
Material (parts)	Print surface is contaminated.	Clean parts.
	Parts have texture.	Check if the product surface is visible, not the screen dots.

Note: Line screen film is not only used to control etch depth, but may be used for large, bold images. The dot pattern that is created in the image by incorporating the line screen film in the etch process acts to support the doctor blade as it travels over the open area of ink. An improperly supported blade will dip into the image and drag ink out. Halftone films may be used in all types of pad printing plates, including: Express, Hydro-Foil, Polymer and Steel clichés.

A halftone screen contains a series of dots (see illustrations at right). A 300-line, 85% halftone film equals 300 dots per square inch. 85% refers to the tint (opaque area) of the screen therefore, a higher level of tint results in greater ink laydown.



Four examples of different percentages and line counts of film screens (enlarged). Note that only the dot size changes between two equal line count screens.

Examples of the same image with and without a screen added to the cliché plate.

PROBLEM:
Edges of print look fuzzy or hairy.

	Cause	Solution
Ink	Ink is too thick.	Add thinner.
	Buildup of ink appears on pad.	See page 4: "Pad is not releasing ink onto part".
	Ink type has high static characteristics.	Use Anti-Static Gel (# 120503) or change to an alternate ink.
Pad	Pad is too flat.	Use a pad with a sharper angle.
	Red silicone pad carries too much static.	Use a white or black silicone pad; (see pad catalog).
Cliché (plate)	Etch is too deep.	Check etch depth and make a new cliché if necessary.
Material (parts)	Parts carry too much static.	Attach deionizing unit to pad printing machine.
Other (conditions)	Room humidity is too low, causing static.	Increase humidity; ideal level is 40-60%.
	Dull doctor blade is pulling hairs out of the back edge of the image.	Sharpen or replace the doctor blade.

Note: If the problem can be seen on the pad before contacting the part, it is most likely an ink, pad or room condition. If you cannot see the problem until after printing on the material, try another material or clean the part to verify that there is no contamination on the surface. Static appears as fuzz in all directions of the image. Doctoring problems appear as lines or fuzz in one direction only.

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PROBLEM:
Distortion of print.

	Cause	Solution
Pad	Pressure is too high. Pad is being overcompressed.	Decrease pad pressure.
	Pad is too small for size of print.	Use larger pad.
	Image is too far off center of pad.	Move print closer to the center of pad.
Material (parts)	Parts have a vertical wall.	Move the pad so it does not contact wall.
	Printing surface is uneven.	Level out the printing surface or distort the artwork.
	Printing is too close to the edge of part.	1. Support the pad at the edge of part. 2. Move the pad so it does not fall off edge.
Other	Pad is not supported throughout contact area.	Build fixture with support for pad.
	Product is not mounted flat.	Part surface should be parallel to cliché surface.
	Fixture is unstable.	Rework fixture.
	Printing surface is on a radius.	1. Use a larger pad. 2. Distort artwork.
	Part moves or flexes when contacted by the pad.	Add support to the part or try to soften pad.

Note: Distortion should not occur when printing on a flat, ridged surface. Trans Tech can test and develop distorted artwork to compensate for uneven printing surfaces.

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PROBLEM:
Unsharp print or blurred image.

	Cause	Solution
Ink	Ink is too thick; (poor line definition, broken letters).	Add thinner.
	Ink is too thin; (blurred image, ballooned characters).	Remix ink.
Pad	Ink is not releasing from pad.	See page 4: “pad is not releasing whole print onto part”.
	Pad is too soft.	Use harder pad.
	Pad is too steep for part angle (round).	Use a larger or flatter pad.
Cliché (plate)	Cliché is etched too deep.	Make new cliché with proper etch depth.
	Screened cliché etch has saw-tooth edges.	Make new cliché with solid etch or see page 10: “screen dots are visible”.
	Artwork is of poor quality.	Clean up artwork.
	Cliché etching is of poor quality.	Inspect cliché with a magnifying glass. Remake cliché if necessary.
Material (parts)	Surface is contaminated.	Pre-clean the parts.
	Surface of the part is textured.	Use a hard pad with a sharp angle.
	Printing surface of the part is not flat; pad and ink are slipping.	1. Try to make the surface flat. 2. Dry the ink as much as possible on pad before transferring to part. 3. Use larger pad on round part. 4. Use hollow pad to lessen part pressure.
Other	Fixture is unstable.	Remake holding fixture.
	Machine cycle is too fast for large, soft pad; wobbling occurs.	1. Slow down machine. 2. Delay pad down-stroke. 3. Use smaller and/or harder pad.
	Pad pressure is excessive. Cliché is not being doctored cleanly.	Decrease pad pressure. Re-hone or replace doctor blade.

PROBLEM:
Shadow or haze on cliché.

	Cause	Solution
Ink	Ink is too thick.	Add thinner.
Blade	Blade is not doctoring properly.	1. Increase blade pressure. 2. Sharpen or replace doctor blade. 3. On open inkwell machines, use fine adjustment screws to correct the problem areas. 4. On closed cup machine, rotate cup 90˚.
	Blade is not installed properly.	Make sure that the blade is locked in the down position.
	Length of cliché (steel): 100 150 200 250 300 350 400 500	*PSI blade pressure:* min. 10 - 20 min. 10 - 25 min. 10 - 30 min. 10 - 35 min. 10 - 40 min. 10 - 45 min. 10 - 50 min. 10 - 60
	Note: Max. pressure will result in excessive blade and cliché wear.	

PROBLEM: Blotting effect on image. CAUSE: Angle of descent incorrect

The shape of the pad controls the "rolling effect" needed for a proper pickup and transfer of ink. The transfer pad is able to pull the image out of the etched area of the cliché due to the ink tack characteristics and the composition of the silicone. During pickup and transfer, this rolling effect pushes air away from the image.

Large angles of descent are better for:

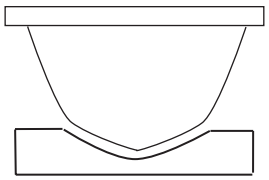
● small images ● highly detailed images ● textured surfaces ● concave print surfaces.

Medium angles of descent are better for:

● bold images ● flat surfaces ● smooth surfaces ● convex print surfaces.

Note: When there is very little or no angle of descent, a blotting effect takes place which results in very poor print quality (see illustration below).

NOT RECOMMENDED



No angle of descent on flat print surface or cliché. ***No angle of descent on concave print surface.***

Your Single Source for Essential Day-To-Day Supplies:

Primary Printing Kit Gives New Pad Printers a Jump Start

WHEN our newer customers first start up their pad printing operations, they often ask us what else they will need beside their machine, pads and inks. After years of experience in the field and here in the ITW Trans Tech print lab, we have designed the **Primary Printing Kit** (part #149000). Our assortment includes a full complement of the essential consumables that no new pad printing operation should be without. This lab-tested kit includes ALL the following supplies.

The **Free-Standing Safety Wash Tank** (part #141001) is an indispensable item for busy shops where cleanup of ink from machine parts and tools is a daily chore. Ideally suited for a cleaning solvent like our dibasic ester, this enamel-finished exterior and galvanized metal interior holds eight gallons of liquid confined with an automatic-close safety lid. This design also allows convenient hands-free opening with a foot bar. A handy steel parts basket enables the user to scrub parts with solvent as the ink residue runs through to the reservoir. A removable plug in the tank allows drainage as needed.

Acid-Resistant Gloves (red pair; part #1412071) are mandatory for safe handling of caustic liquids. These are standard issues in our print lab along with **Solvent-Resistant Gloves** (green pair; part #141207) for ink mixing or handling of parts while cleaning with ink solvents or other harmful chemicals. **Black Bristle Brushes** (12; part #141107) are useful for detailed cleanup of ink cups, spatulas or other parts along with the **M-Box Dispenser** (part #1419004) & M-Tork (six rolls; part #1419002). These heavy-duty utility towels hold up better than paper and their convenient dispenser is ideal for cleanups. Of course, once you're done be sure to get that grime off your hands with our **Inx-Off! Hand Cleaner** (250 ml; part #1411131), the best product we know for getting stubborn ink stains off your skin.

Ink mixing is made easier by using our **Mixing Cups** (50; part #141039) & **Stir Sticks** (50; part #141108). The cups are made of uncoated and unlined paper stock so that they are unaffected by solvents or inks. This applies to the wooden mixing sticks as well; both are disposable. When mixing various solvents into inks, our **Dispensing Squeeze Bottles** (one qt.; 4; parts #1410167, -72, -73, -79) with color-coded spouts ensure safe, easy control of liquids. Our **Safety Plunger Can** (one qt.; part #1410165) is preferred by busy pad printers for convenient one-hand dispensing of solvents onto a rag or towel during cleanup.

Another item that is used constantly in working with pad printing machines is our nine-piece **Allen Wrench Set** (metric; part #1421651). Its handy case keeps the wrenches in proper order right where you need them. Get a set for each pad printer.

Anti-Corrosion Spray (12 oz.; part #141111) protects pad printing plates from corrosion by forming a protective film coating. This prevents moisture from oxidizing the polished steel surface. Excellent for short or long term plate storage, it can be removed easily with conventional cleaning solvents, such as Trans Tech Cliché Spray.

Long Life Oil (16 oz.; part #141112) prolongs the life of silicone rubber transfer pads while promoting excellent ink transferability. When applied properly, it replenishes the silicone oil to the pad body that normally becomes lost during printing operations. This is an ideal product for short & long term pad storage.

Pad Cleaner (1 qt.; part #1411121) is designed for the proper cleaning of silicone rubber transfer pads. It safely removes dust, dirt, ink & other contaminants while prolonging pad life. Pad cleaner minimizes excessive silicone oil removal from the pad body. Use before, during & after printing operations as required.

Cliché Spray (500 ml; part #141110) dissolves dried ink in the etched areas of cliché printing plates, on the doctor blade assembly, spatula, inkwell or any other machine component surface. Since it does not contaminate the ink, it becomes an excellent tool for restarting the printing operation after long periods of idle time. And don't forget to use the **Brass Brush** (part #1411071) with cliché spray for proper cleaning of your steel clichés. This brush is specifically designed to get ink out of the etched areas without harming the metal surface.

Of course, all the above consumable items are included in our **Primary Printing Kit** to help the novice pad printers get a quick start without the hassle of trial-and-error searching for suitable supplies. Even experienced shops can use these items day in and day out.

For further information or to place an order, contact your Consumable Products Rep via phone: 630.752.4000 or fax: 630.752.4489 or internet: http://www.itwtranstech.com/Contact
You can also place your order online at www.itwtranstech.com

Valuable Consumable Products & Services For Your Specific Pad Printing Needs:

Your top-of-the-line equipment requires the same excellent level of supplies and services.

ITW Trans Tech carries a full inventory of the highest quality consumable products demanded by the product decorating industry. Whether you need pad printing clichés, pads, inks or other special supplies, these consumables and related service are the finest available worldwide.

In addition, Trans Tech offers its customers a complete in-house source for the particular demands of industrial three-dimensional decorating, including:

- ■ High-tech art production using specialized graphic arts equipment, computerized design and an art staff experienced in solving unique pad printing challenges
- ● Dedicated test print lab for research on ink-to-substrate compatibility, pad suitability, image distortion and customer training
- ▲ Complete platemaking facilities for processing and etching steel cliché drums, plates and foils plus polymer and hydro-foil clichés
- ■ Machine shop for part holding-fixture design, building and testing as well as padprinting machine service
- ● Custom mixing and color matching of pad printing inks to formula specifications
- ▲ Custom design of automation systems for high volume industrial applications, including part indexing, orientation, load & unloading, surface pretreatment and post-print curing.

For more information or to place an order, call our TOLL-FREE Service Phone or e-mail us via our website.

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