



Waterless Printing Trouble shooting Guide

Background Toning



Background toning occurs when the silicone layer starts accepting ink for some reason.



Causes

1. Thickness of the silicone layer reduces.

The ink repellency is in proportion to the thickness of silicone layer. The silicone layer gradually loses ink repellency when the thickness of silicone layer reduces (wear / abrasion on press) , which causes background toning.

Wear out of the silicone layer due to the paper dust piling on the blanket cylinder.

2. Damage on the silicone layer (Pin- hole).

When there is a hole in the silicone layer, the photosensitive layer of the corresponding part would be exposed and accept ink.

When the gray scale level is too low, the bond between the photosensitive layer and the silicone layer of the non-image area will be too weak, which will cause silicone peeling.

3. Caused by the plate: Particle in the silicone layer

When a foreign particle with ink acceptability is mixed with the silicone layer, the silicone layer of the corresponding area does not repel ink, which will cause background toning.

Dye solution adhering on silicone layer.

4. Caused by ink: Lower viscosity

The ink repellency is in proportion to the viscosity of ink. When the ink viscosity is below a certain level, the ink does not repel silicone layer and background toning occurs.

When the ink temperature rises, and when a low viscosity solution is mixed into ink

5. Caused by Press: Low ink peel off speed (Ink stays on the silicone layer too long)

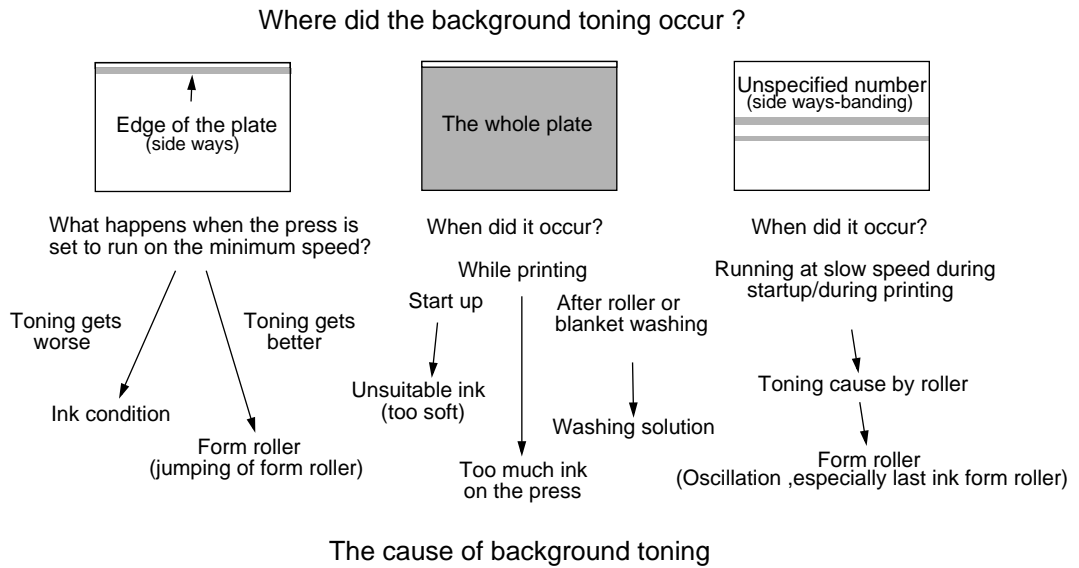
When the ink on the form roller skids on the silicone surface, the ink will stay on the silicone layer too long and cause background toning.

- 1) *The peripheral velocity of the plate cylinder and the form roller is different (Press roller setting).*
- 2) *Oscillation of the form roller (Roller which avoids Ghosting)*
- 3) *Edge jumping of the form roller*

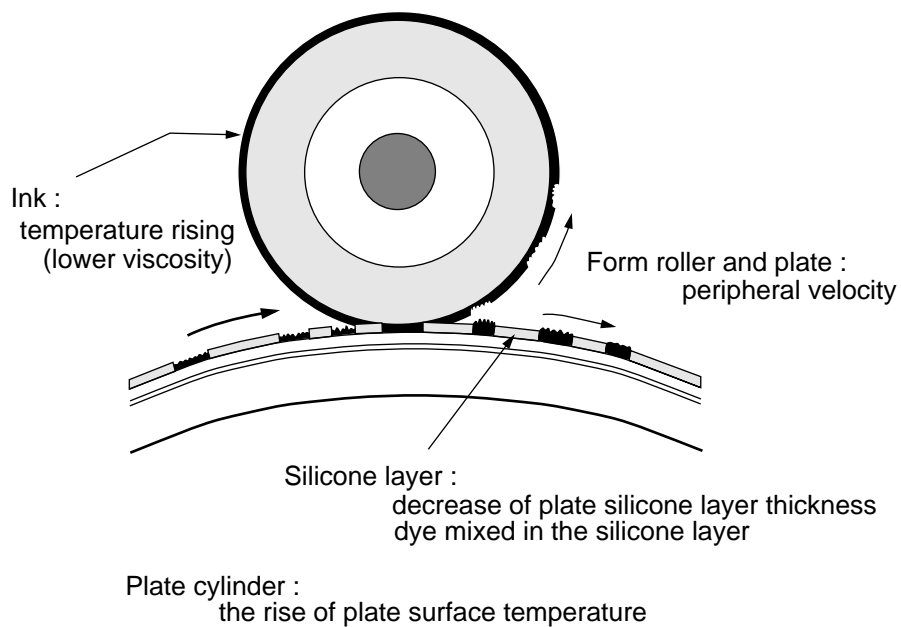


How to distinguish the cause of background toning

Refer to the following chart and distinguish the cause of background toning



The picture of how background toning occurs





Toning at the gripping edge

Cause The ink viscosity becomes too low due to high press temperature.

Solution Exchange the ink to high viscosity type, or decrease the temperature of the press by decreasing the temperature of either the cooling water or the room temperature.

The toning will spread during the start up by a lower speed. The toning will be worse when the printing speed is lower.

Cause Form roller is bouncing near the gripping edge of the plate cylinder.

Solution Reduce the nip pressure of the particular form roller whose pressure is too high.

The toning will either become light or disappear when the printing speed is reduced. Check if the bearing of the roller shaft is fixed.

Cause Plate packing or blanket packing is not fixed in the right position, and there is a crease at the gripping edge. (When paper is used as packing).

Solution Change the packing paper with a new one.

Check by hand if the particular part of the plate or the blanket is convex.

Cause Plate flapping at gripping edge.

Solution Check if the plate grip is tight, and adjust if not.

Abnormal noise could be heard from the plate cylinder when exerting pressure between the blanket cylinder and impression cylinder. The plate will either buckle or be torn if the press continues to run at this condition.



Toning at the opposite side of the gripping edge

Cause The silicone rubber of the opposite side of the gripping edge is worn out due to the difference between the peripheral velocity of the plate cylinder and the blanket cylinder.

Solution Re-check the press setting. (Adjust the over bearer of the blanket cylinder to be smaller than that of the plate cylinder, so that the peripheral velocity of plate cylinder and blanket cylinder would be the same).

As for a press with shallow cut-down of the blanket, use a high compression blanket.

Because this phenomenon comes from the silicone wear out, it is seen when the press is used for quite a long time. When the paper is a type with a large amount of paper dust, this phenomenon may be seen after ten or twenty thousand impressions.

Cause The blanket was not fastened tight enough when exchanged, and became loose from the cylinder.

Solution Make sure that the blanket is firmly attached to the cylinder after being exchanged.

Abnormal noise could be heard from the blanket cylinder when exerting pressure between the blanket cylinder and impression cylinder.



Toning in a side-ways grid

Cause Form roller (especially the last ink form roller) is oscillating.

Solution Insert a spacer at the roller bearing to stop the oscillation.

Outstands especially when the printing speed is low. The grid is easily seen on the blanket.

Cause The oscillating roller to avoid ghosting is used as the last ink form roller, and this oscillation caused toning.

Solution Fix the roller in order to stop the oscillation.

May cause overall toning.

Cause Shock-streak of the blanket

Solution Change the blanket to a high compression one.

This phenomenon is seen especially after exchanging the blanket to a new one, and the impression pressure is high.

Cause The form roller (especially the last ink form roller) is deformed, and that particular part bounds on the plate surface.

Solution Identify the deformed roller and exchange with a new roller.

The width of the toning is comparatively wide and dim.

Cause Plate packing or blanket packing is not fixed in the right position, and there is a crease at the gripping edge.

Solution Exchange the packing paper (Try to use a small number of thick paper sheets).

Especially seen when a thin packing paper is used.



Partly toning

Cause Low viscosity component such as oil and solvents drip on to the inker, plate or the blanket and makes the viscosity of ink low.

Solution Check for occurrence of solution adhering to on the bar and safety bar or for residue of blanket washing solution.

Sudden toning is seen vertically to the printing. When a few drops of solution is on the plate or blanket, toning occurs in a dripping form.

Cause Partial dents on the form roller makes the form roller slip on the plate.

Solution Identify the roller with dent and exchange.

The ink is apt to remain at the dent part after roller washing, so it is easier to identify at that timing.

Cause Colorant of the after-treatment solution adhered to the silicone layer because the plates were piled on top of another, which reduced the ink repellency of that particular area.

Solution Use slightly harder ink. Rub that particular part with hand developer HP-7N and wipe with PC-1.

When this phenomenon is discovered before printing, it could be improved by developing this plate with a processor again.

The non-image area corresponding to the toning is slightly dyed. It is apt to be seen when the printing condition is close to the border between normal and toning. Disappears after many impressions.

Cause The nip pressure of one side of the form roller is different from the other, and the form roller bounces on the plate surface.

Solution Adjust form roller setting, such as form roller/plate pressure or form roller/oscillating roller.

Occurs when the ink temperature is close to the border line between normal and toning.

Cause The cylinder setting is not even, and the silicone layer of a certain part is worn out.

Solution Adjust the press setting (over bearer), and check the trace of impression of plate/blanket.

This occurs after the press has been running for a long time

Cause Gum on the plate surface.

Solution Wash the plate with water (It can not be removed easily by organic solvent).

The toning turns up like a spot (2 -3 mm in diameter) in a wide area.

Cause Too much ink (especially black ink).

Solution Reduce amount of ink to an appropriate amount. Sheet off the extra ink.

The toning will show up only on the high-density area vertically, or the ink will spatter around the letters.



Toning is seen on only one part of the printing

Cause Too much ink, or the ink viscosity is too low.

Solution

Reduce the amount of ink to an appropriate amount.

Use ink of higher viscosity, or lower the plate surface temperature.

This phenomenon is seen around the fine letters and shadow part.

Cause

Ink from the previous unit is piling on the blanket and makes the impression pre of that art higher, which makes the silicone layer wear out. (Ink set is too rapid.)

Solution

Make sure that there is no ink left when washing the blanket.

Add 2 ~3% of varnish (linseed oil) to the ink to reduce the drying speed.

Apt to occur when the ink from the previous unit is piling on the blanket, and when the press has been running for a long time.

Cause

The silicone layer was worn out due to the edge piling on the blanket.

Solution

Lower the ink tack (add compounds).

When the ink tack is too low, wash the rollers.

Make a solid part outside the printing area when there is many blank parts on the printing.

This phenomenon is seen on the opposite side of gripping edge of the image area. It is apt to occur after the press has been stopped for a long time, or when there are many blank (white) areas on the printing.

Cause

Hard particles under the plate or blanket make a convex surface. The silicone layer of the corresponding part is worn out because of the high pressure

Solution

Check the plate or blanket by hand, and get rid of the hard particle.

Occurs after running the press for a while, and gets worse as the impression increases.

Cause

An aggressive solution adheres on the plate surface, dissolves the photo-sensitive layer and causes silicone peeling.

Solution

Delete this silicone peeling with ST-1 correction fluid when it is seen on the non-image area.

The plate must be re-made (new plate imaged and processed) if this silicone peeling is seen on the image area.

Mostly caused by an aggressive solution such as blanket recovery solvent. Also caused by a stop out solution for wet-litho plates.

Cause

Ink on particles (paper dust, fiber and so on) on the blanket.

Solution

Wash the blanket, use ink of higher viscosity or lower the plate temperature.

The toning appears like a pin-hole or lint. This phenomenon is only seen when the image area of the blanket is very dirty.



Over all toning

Cause The washing solution left inside the inker or on the blanket got mixed in with the ink, and lowered the viscosity of the ink.

Solution Finish with a spray of high volatile solution (such as PC-1) when washing the rollers..When washing the blanket, wipe with drying material and make sure that the blanket is completely dry.

Apt to occur right after washing, when the press temperature is almost too high.

Cause The ink is too soft when the press temperature is high.

Solution Wash the rollers and use appropriate viscosity ink

Reduce the usage of reducer compounds which makes the ink viscosity low.

This phenomenon is seen when the ink viscosity is remarkably low due to a large amount of compounds, or when ink for wet-litho plate is used for waterless.

Cause Spots are seen on silicone layer all over the plate due to insufficient exposure for positive working analog plates.(Gray scale level under 4).

Solution Check the gray scale level and expose by appropriate gray scale level.

When the temperature of vacuum frame is too low, silicone peeling is apt to occur even if the exposure time is appropriate.

Cause Mismatch of the peripheral velocity of the form roller and plate cylinder from the start (when the press was designed).

Solution The gear has to be changed

Please discuss with the press manufacturer

Cause Plasticizer comprised in the rubber roller is mixed with to the ink and the ink viscosity becomes low.

Solution Use ink of harder viscosity temporarily, or lower the press temperature.If there is time, wrap the roller with medium and leave it for a day in to completely remove plasticizer.

Cause Spots on the silicone layer all over the plate caused by the paper dust pile on the blanket wearing out the silicone layer

Solution Exchange with a new plate (Plate is beyond the durability). Install paper dust removal system on press.

Apt to occur in an earlier stage as the paper quality is worse and the plate/blanket pressure is higher.

Cause Low ink viscosity caused by too much dry out inhibitor.

Solution Wash the roller when the toning does not disappear after printing on waste paper.

Apt to occur when the press has been stopped for 1 or 2 hours.



Toning on the edge of the paper

Cause

Scratch caused by dust from the paper edge piling on the blanket.

Solution

Increase the frequency of blanket washing when using paper with a large amount of paper dust. Take out the packing paper of the edge part from the blanket cylinder when the paper size is the maximum size.

The scratch will gradually become deeper when the press keeps running.

Cause

A large amount of extra ink on both edges.

Solution

Reduce extra ink by sheeting off, or washing the rollers.

Apt to occur when the image on both sides of the printing is very large and the density is high on that particular part.

Cause

The press frame (circulating oil) temperature becomes high when printing a long run job at high speed, and the plate edge temperature is much higher than that of the plate center.

Solution

Lower the press temperature by lowering the cooling water temperature or by increasing the amount of cooling water.

Apt to occur when the flow volume of cooling water is low on a sheet-fed press.

Cause

The non-image area of the blanket is soiled with ink, and was transferred to the paper when the paper size became slightly larger.

Solution

Lower the press temperature or change the ink to a suitable type.

Toning is seen on the edge of the paper (end side).

Poor ink lay down



Occurs when the ink acceptance of the plate (image area) or the ink transfer becomes insufficient for some reason.



Cause:

1. Plate: Poor ink acceptance of the plate (image area)

This happens when the plate is left for a long time after pre-press, or when printed with a very low temperature.

*Pre-pressed plate left for a few months without being printed.
When the plate temperature is very low such as under 15 °C.*

2. Ink: Ink viscosity becomes higher (Change of temperature or composition).

When the temperature is low or when the viscosity of ink becomes higher because of the volatilization of ink solvent during printing, poor ink transfer occurs which will cause poor ink laydown.

*When the temperature is low (such as morning in winter after the weekend).
Printing with very small area of image (=very small amount of ink).*

3. Press: Low impression pressure (especially plate/blanket pressure).

When the impression pressure (especially plate/blanket pressure) becomes low, poor ink transfer will occur which will cause poor ink laydown (especially at the shadow area).

*Low impression pressure of both plate/blanket and blanket/
impression occurs due to wear out of the blanket. This could
be adjusted by the initial press setting.
(Especially when the pressure is under 0.1mm).*

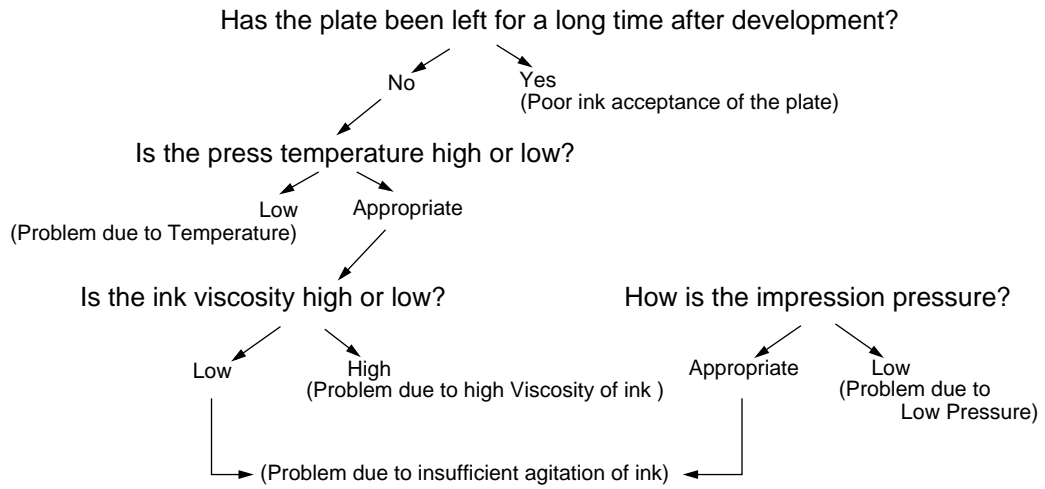
4. Press: Insufficient nip pressure of distributing roller.

When the nip pressure of distributing roller is insufficient, the ink would not be mixed up enough and cause poor ink laydown.

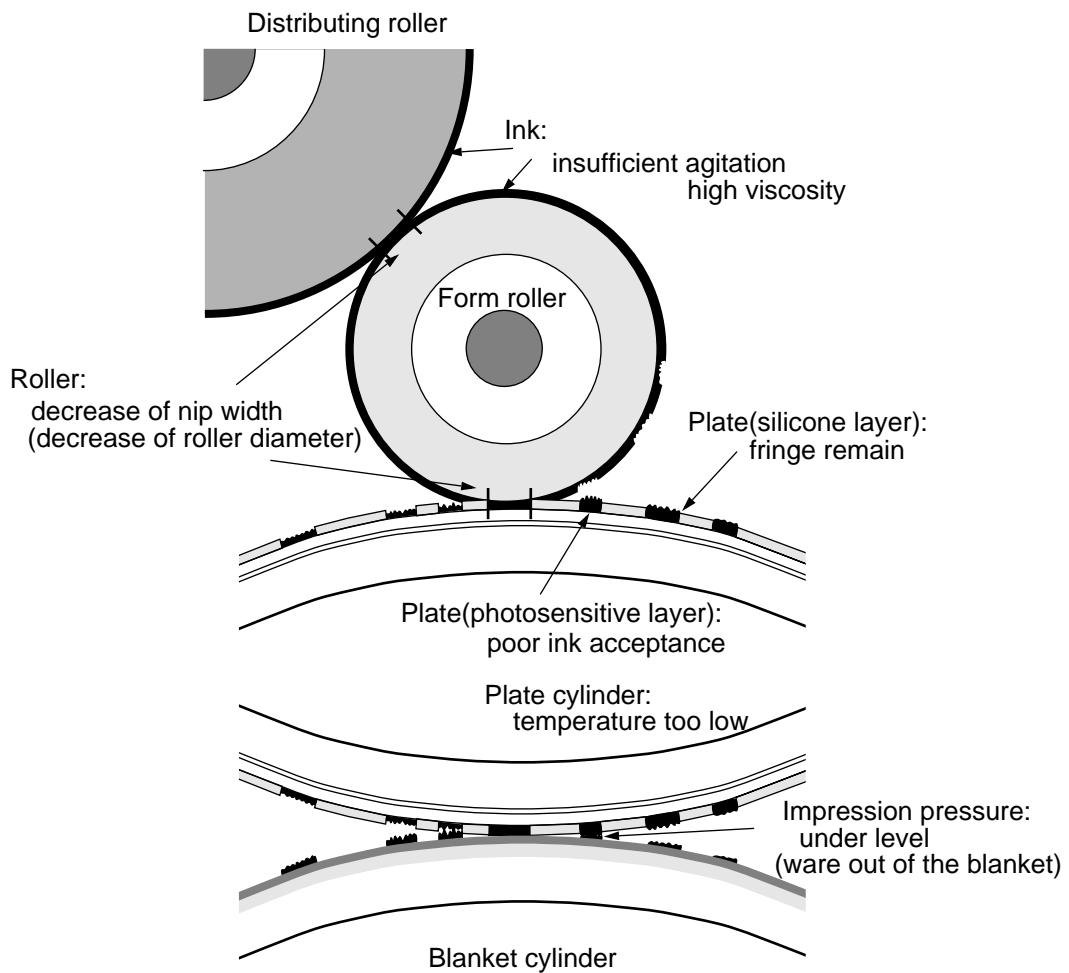
*Decrease of nip pressure due to the decrease of roller diameter with time.
The roller is too soft.*



How to distinguish the cause of poor ink laydown



The picture of how poor ink laydown occurs





Poor ink lay down in the shadow area

Cause High ink viscosity, ink dries on the press.

Solution Wash the rollers and add a few percents of linseed oil to the ink if the ink viscosity is too high.

Mix drying inhibitor to ink if the ink dries on the press

Make a shadow area out side the printing area in order to increase the ink flow.

Apt to occur when the image area is very small, or when the press has been stopped for a long time.

Cause The ink viscosity is too high (ink is unsuited for the press temperature).

Solution Either soften the ink by adding auxiliaries, or warm up the press.

In winter time when the temperature is under 20 deg C, first use ink for wet-litho plates and when the toning appears on the grip edge part, change to waterless ink.

Cause Low impression pressure due to wear out of blanket and packing paper.

Solution Measure the over bearer using a cylinder gauge and add packing paper.

Re-set the press setting when the press condition becomes stable in order to at least keep the normal impression pressure level of the press.

The blanket gradually wears out with time. Normally the thickness of the blanket decreases for about 0.05mm. The thickness of packing paper also decreases.

Cause Low impression pressure caused by a too soft blanket.

Solution Apt to occur when the cut down of the blanket cylinder is over 2.5mm. Either set the blanket packing thicker by 0.05mm or change to a harder blanket.

When the cut down is less than 2.0mm and the blanket is too hard, the durability of the plate decreases.

Cause Insufficient agitation of ink.(Decrease of the roller diameter with age, or the roller rubber is too soft).

Solution Increase the nip pressure of the distributing roller

Cause Ink solvent is absorbed by the rollers due to insufficient solvent resistance of rollers, which increases the viscosity of ink.

Solution Add a few percentage of linseed oil to ink.

Apt to occur when the rollers are exchanged with new ones.

Cause Poor ink acceptance of the paper(cast coated paper).

Solution Soften the ink in order to improve the ink transfer.

Add 1/3 ? 1/2 of ink for synthetic paper.

Keep the press temperature as high as possible without causing toning problems.



Unevenness of ink laydown on the dots

Cause Powder piling on the cylinder, powder transported to the rollers.

Solution Increase the frequency of cylinder washing. If ink laydown does not improve, wash rollers.

Decrease the amount of powder.

Avoid using a large amount of powder for the waste paper (start up). The impression pressure increases when the powder piles on the cylinder, which causes dot gain. Make sure that powder does not pile on rider roller after washing the rollers.

Cause The silicone on the image area is not completely removed (silicone fringes left on image area).

Solution Use hand developing solution (HP-7N) to do the processing on the press.

Check if the plate was exposed by room light or sun light during pre-press.

Check the processing condition of the processor (wear out of the brush, flow volume of the pre-treatment solution).

Cause Unnecessary ink transfer between dots (non-image area) caused by too much ink on the press.

Solution Adjust the ink volume. If high density is required, use ink with high concentration of pigment.

Especially be careful of the black ink. Small prints may disappear by this problem.

Cause Ink transfer between the dots (non-image area) caused by bad ink conditions Slight toning is occurring

Solution Change the ink to a harder type. Decrease the temperature of the press.

The image area of the blanket is very dirty.

Cause Poor ink acceptance of the plate with time.

Solution Wipe the plate surface with plate cleaner (PC-1) or hand developer. If there are other plates in the same condition without being printed, develop the plates again with processor.

Apt to occur when the plate is left unprinted after development. Would not happen so often when the plate is stored after printing.

Cause Hollow dots and poor ink transfer caused by low impression pressure.

Solution Measure the impression pressure using a cylinder gauge and adjust blanket packing.

Will not improve by roller washing, blanket washing or exchanging ink. The ink laydown on the shadow area should be insufficient.

Cause Hollow dots caused by low density of printing.

Solution Adjust the balance of the printing density between each color.

Mix Medium with the ink and decrease the concentration of pigment in the ink.

Check if the color samples are printed in good condition.



Streaky unevenness of ink lay down

Cause

The developing performance of the raw plate is deteriorated by unnecessary exposure, and silicone fringe is left in a stripe like pattern after development.

Solution

Avoid unnecessary exposure. Use safety light as a room light.
Use hand-developing solution(HP-7N) to develop the plates on the press.

When this phenomenon occurs repeatedly, it is probably caused by unnecessary exposure.

Cause

The developing performance of the processor deteriorates (the developing brush wears out), and the silicone fringe is left on the plate like a stripe.

Solution

Use hand-developing solution (HP-7N) to develop the plates on the press.
Check if the pre-treatment solution flow volume is appropriate, or if the brush pressure is high enough.

If this problem is caused by wear out of the brush, the bristle of the brush has to be exchanged. In this case, poor ink lay-down occurs mainly on the highlight dots repeatedly.



Uneven ink lay down all over the plate

Cause

Poor ink laydown on the image area due to very low press temperature (under 15 deg C)

Solution

Lower the ink viscosity or increase the press temperature.
Apt to occur in a winter morning after a long holiday.

Cause

Poor ink acceptance of the plate due to long storage of the plate after development (without being printed).

Solution

Use hand-developing solution to develop the plates on the press, or develop the plates again by processor.

The ink acceptance does not change so much after printing.



Ink lay down gradually becomes worse (temporarily improve by washing the blanket).

Cause

High viscosity ink or dry ink is piling on the image area of the plate.

Solution

Wash the plate surface. Wash the rollers if it does not improve.
Exchange the ink to a new one if it is almost drying out in the ink duct, and agitate the ink in the ink duct from time to time.

Be careful when the image area is small for the revolution speed of the feed roller will be slow. Close the key as much as possible and increase the rotating speed of the feed roller.

Cause

Low impression pressure between the plate and blanket.

Solution

The pressure should be at least be 0.1mm.

If this is caused by the wear out of blanket, the impression pressure of both plate/blanket and blanket/impression cylinder would be low.

Cause

A large amount of powder is mixed with ink at the roller, and the fluidity of ink is extremely low.

Solution

Wash the rollers. If there is powder left on the rider roller after washing the rollers, make sure to clean the rider roller.

Cause

The nip pressure between the form rollers and the plate is too low.

Solution

Increase the nip pressure between the first two form rollers and the plate, higher than the standard press setting.

Around 5 -6mm when using plates sized 1030x800. As for the third and last form roller, decrease the nip pressure lower than the standard press setting in order to avoid toning problems.

Poor dot reproduction (positive analog plates)



Hollow dots can be seen when the developing performance of the plate or the processor is bad for some reason, or when the plate is over developed.



Cause

1. Film: Insufficient black density.

Masking sheet: Insufficient opacity.

Unnecessary exposure of the raw plate will occur when the blackening density of the film is too low or the opacity of the masking sheet is insufficient, which will cause poor dot reproduction due to poor development.

2. Plate: Unnecessary exposure

The photosensitive layer will start reacting to light when the plate is exposed to light over limit, and the bond between silicone rubber layer and photosensitive layer will be strengthened. This will cause poor development and poor dot reproduction occurs.

3. Plate: Excessive exposure

The image area will be irradiated with UV light and the processing performance of that particular dot area on the plate will be insufficient when the plate is overexposed, and small dots will not be lost.

4. Plate: Insufficient contact between the plate and the film.

When there is too much space between the plate and film caused by insufficient vacuum, hard particle between the plate and film or the back exposure of the film, the image area will be irradiated with UV light and the processing performance of that particular dot area on the plate will be insufficient. This is apt to cause fogging problem.

5. Plate: Poor ink acceptance of the image area.

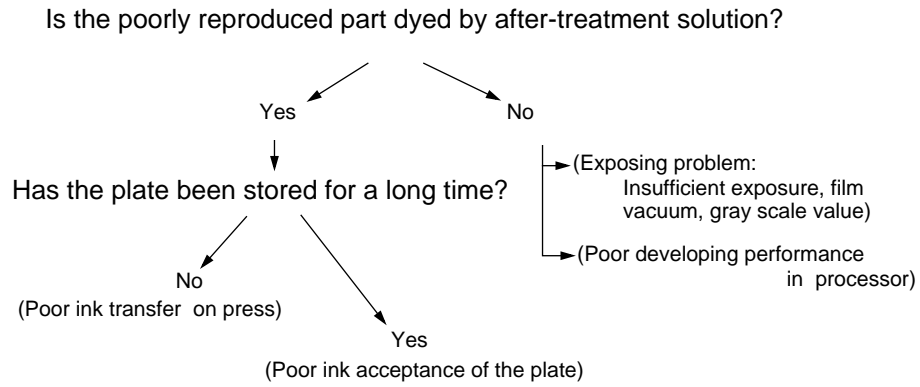
When storing the processed plate for a long time without printing or when the temperature is very low, the ink acceptance of the plate goes bad and dot missing occurs. In this case, it is easily determined for the dots on the processed plates are stained by after-treatment solution.

6. Plate: Plate performance deteriorates with time.

When the raw plate is stored in a cool, dark plate, the performance of the plate itself deteriorates and causes poor development.



How to distinguish the cause of poor dot reproduction





Poor reproduction of the highlight dots

Cause Exposing problem

Solution

Check the cause of the problem during exposure, and pre-press the plate again.

Check the exposing procedure (Photo reduce of film, unnecessary exposing, vacuum contact, gray scale).

There is no sign of the dots on the processed plate.

Cause Poor development

Solution

Use hand developing solution to develop the plates again

Check the exposing procedure (Photo reduce of film, unnecessary exposing, vacuum contact, gray scale)

Check the developing procedure (Brush pressure, pre-treatment solution flow volume)

*The dots are seen on the plate but it is not processed.
(It is not dyed by after-treatment solution)*

Cause Poor ink acceptance / transfer (Image area of the plate or ink).

Solution

If it is caused by the pre-press procedure, wipe the plate surface with hand developing solution.

If it is caused by ink, use reducer to make the ink softer.

Refer to the article of poor ink laydown. The dot is seen on the pre-pressed plate but ink does not transfer to the dot (The dot on the pre-pressed plate is dyed by after-treatment solution).



Poor reproduction of the dots on the shadow area.

Cause

Exposing problem.

Solution

Check the cause of the problem during exposure, and pre-press the plate again.

Check the exposing procedure (Photoreduce of film, unnecessary exposing, vacuum contact, gray scale)

The dot is already missing on the pre-pressed plates.

Cause

Too much ink on the press, slur, double toning, too much impression pressure.

Solution

Check each issue and adjust the cause.

The dot is reproduced on the pre-pressed plate.

The cause of the problem comes from the ink density control and press control.



Partial poor reproduction of dots.

Cause Back exposure occurs on a certain part of the film because of the fixing tape.

The corresponding part of the film is photoreduced, and the density of the film is insufficient.

Solution Use hand developing solution (HP-7N) to process the plate again.

If hand developing doesn't work, dimidiate the exposure intensity and carry out the exposure again.

Cause Poor development caused by unnecessary exposure of the plate.

Solution Use hand developing solution (HP-7N) to process the plate again.

Check if the plate is unnecessarily exposed by light coming from the exposing machine through the gap between the plate and the film.

Cause Poor developing performance of the plate caused by a long time storage after exposure.

Solution Use hand developing solution (HP-7N) to process the plate again.

Process the other unprocessed but exposed plates if there are any.

Cause The plate was exposed with water or oil acquired on the surface.

Solution Use hand developing solution (HP-7N) to process the plate again.

Cause Something transparent such as film glue was adhered on the emulsion side of the cover foil.

Solution Use hand developing solution (HP-7N) to process the plate again.

Remove the object causing this problem and expose again if hand developing doesn't work.

Cause Stop out solution film is seen on the corresponding part.

Solution Use hand developing solution (HP-7N) to process the plate again.

Occurs when the stop out solution spatters on the image area of the plate and is not completely wiped off.

Cause Oil adhered to the stain-proof paper of the transfer cylinder transferred to the paper and repelled ink.

Solution Check the corresponding part and exchange the stain-proof paper for transfer cylinder.

This occurs when oil adheres to the blanket, but it will gradually be removed during printing.

Cause Dent on the blanket.

Solution Check the blanket and exchange if there is a dent.



Missing dots during exposure

Cause

Fixing tape is too close to the image.

Solution

Use hand developing solution (HP-7N) to process the plate again.

Keep the fixing tape away from the image for at least 5mm if hand developing doesn't work.

Cause

The mask of the exposure machine is too far away from the image.

Solution

Use hand developing solution (HP-7N) to process the plate again.

Change the position of the mask about 2 - 3mm inside of the image and carry out the exposure again if hand development doesn't work.

Cause

Particle is on the vacuum glass or film.

Solution

Use hand developing solution (HP-7N) to process the plate again

Remove the particle and carry out the exposure again if hand development doesn't work.

Cause

There is air between the film and plate.

Solution

Use hand developing solution (HP-7N) to process the plate again.

Extend the time of vacuum contact and expose with lower gray scale value if hand development doesn't work.

Paper picking and Edge picking



Occurs when the ink tack rises for some reason to the point where the paper surface cannot bear.



Cause

1. Ink: Ink tack rise (change of temperature or composition)

Occurs when the ink tack rises due to low temperature or higher ink viscosity caused by the volatilization of ink solvent during printing.

Apt to occur in winter mornings after a long holiday when the temperature is low, when the image area is small which means that the ink consumption is very small, or after the press has been stopped for a long time.

2. Paper: Paper setting is too rapid.

Occurs when the paper sets too fast and the viscosity of ink on the blanket is high.

Apt to occur when using mid-quality coated paper.

3. Paper: The intensity of paper surface is low.

Even if the ink tack is the same, paper picking occurs when the paper surface intensity is low. The coated layer will be peeled off if it is the coated paper, and the paper fiber will be peeled off if it is an uncoated paper.

Apt to occur when recycled paper with short fiber is used.

4. Press: The printing speed is high

The ink tack appears to be high when the printing speed is high, which will cause paper peeling.

5. Press: Impression pressure of blanket/ impression cylinder is too high

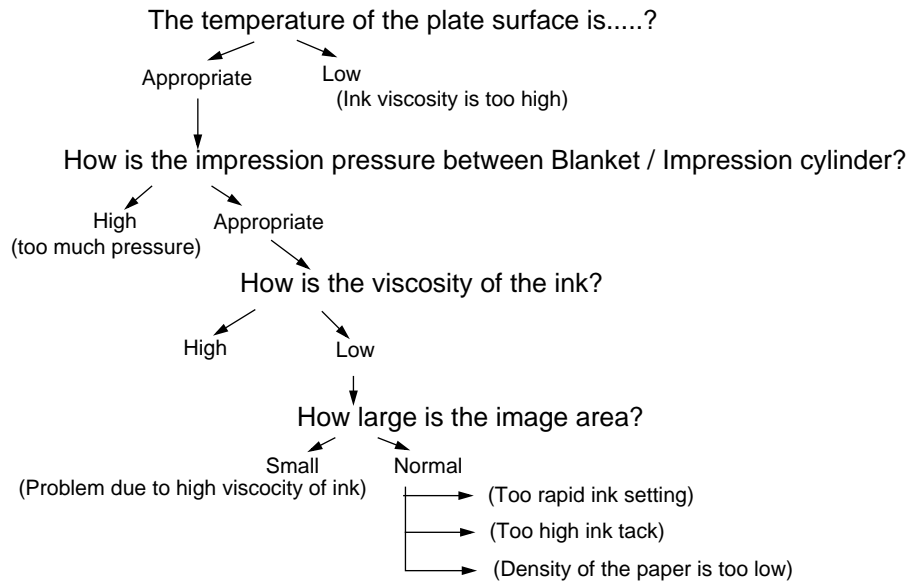
If the impression pressure is too high, a rapid change of pressure occurs when the ink is detached from paper, which will cause paper peeling.

6. Blanket: Insufficient solvent resistance of rubber.

When the solvent resistance of rubber blanket is insufficient, the solvent of ink would be absorbed after blanket washing. This will temporarily raise the viscosity of ink which makes the ink tack higher, and cause paper peeling.ÅB



How to distinguish the cause of paper picking and edge picking



Emergency measures



Wash the rollers/blanket and print about 100 sheets of paper, which would not cause paper picking. Then start printing the job with enough ink on the blanket.

When the blanket has just been washed and there is no ink, the ink solvent is apt to soak into the blanket surface (rubber). This will make the ink viscosity too high and cause paper picking.



Spray an inhibitor to the blanket

Temporarily softens the ink on the blanket. Apt to cause background toning with too much amount of inhibitor.



Add compound to the ink to reduce the tack value.

Maximum 3% of compound could be added when the image area is small.



Exchange the blanket if the surface is rough.

Insufficient Gloss



When the ink on the paper is dry without the surface of the ink coating being smooth, irregular reflection of light will occur on the surface of the ink coating, which will cause poor gloss.



Cause

1. Ink: Ink setting is too rapid.

The surface of the ink coating will not be smooth enough when the ink setting is too rapid, which would cause poor gloss.

This occurs when the ink temperature is below appropriate level.

2. Ink: Insufficient fluidity.

When the temperature is low or viscosity becomes too high because of evaporation of ink solvent during printing, the surface of the ink coating will not be smooth enough because of low ink fluidity. These conditions will cause poor gloss.

Apt to occur in the morning after a holiday when the temperature is low, or when the ink flow is very low (the image area is small).

3. Paper: Ink setting is too rapid.

The ink setting varies by the quality of the paper coating and the base paper. It also varies by the manufacturer and type of paper (coated paper) and the quality of ink, and the gloss becomes poor when the ink sets too rapidly.

4. Printing: The density of the printing is low.

When the density of the printing is generally light, the setting time will be shorter which will cause poor gloss.

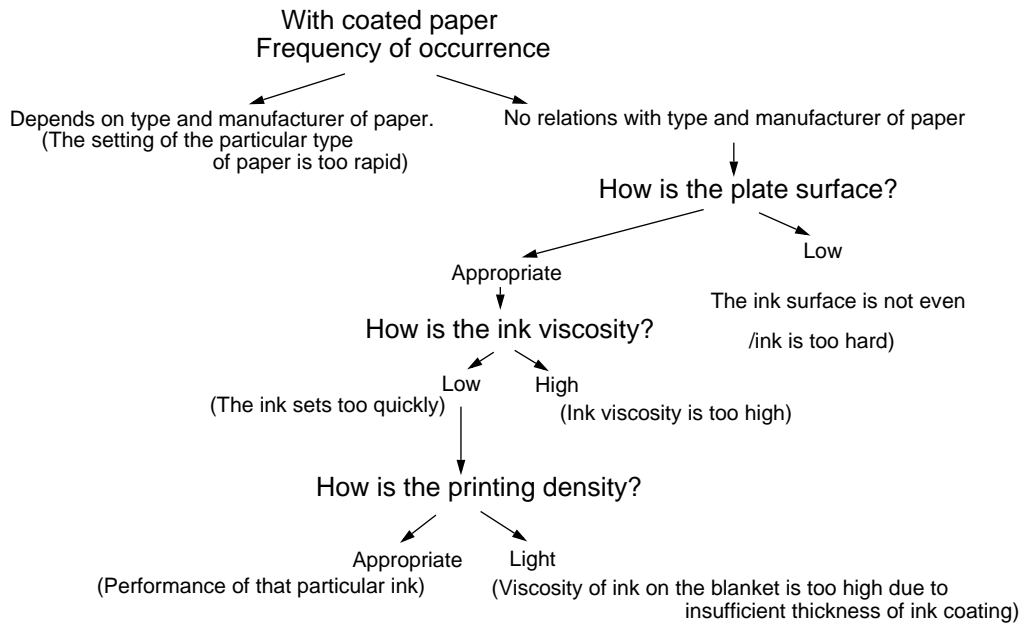
5. Printing: The interval of overprinting (Two-color press).

When the second color is printed on the first color which is not set yet, the surface of the first ink coating will be damaged and poor gloss will occur.

Poor gloss is apt to be worse on an area where the overprinted amount of ink is larger.



How to distinguish the cause of poor gloss



Emergency Measures



Consult with the ink manufacturer

Scratch



When the silicone layer of the non-image area is scratched for some reason and the scratch reaches the photosensitive layer; that certain area will accept ink and the scratch will be seen on the printing.



Cause

1. Handling scratch.

Scratch problem is apt to occur when the plate surface is scratched by the edge of another plate or when there is a hard particle between plates piled on top of each other.

Scratch is seen at the point of contact.

2. Hickey picker.

A dedicated hickey picker with silicone rubber on the tip will not cause scratches, but when there is a hard particle such as ink residue sticking on the edge, this may cause scratches.

(Seen on the printing in vertical directions)

3. Hard particle on the blanket.

When there is a hard particle on the blanket, a pinhole-like toning starts to occur and will gradually expand.

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4. Hard particle on the form roller.

Scratches are seen in vertical directions when there is a hard particle like aluminum burr or hardened ink on the form roller.

A spot toning is seen at first, and will gradually turn into a line. There may be a double line toning when the form roller is unsteady.

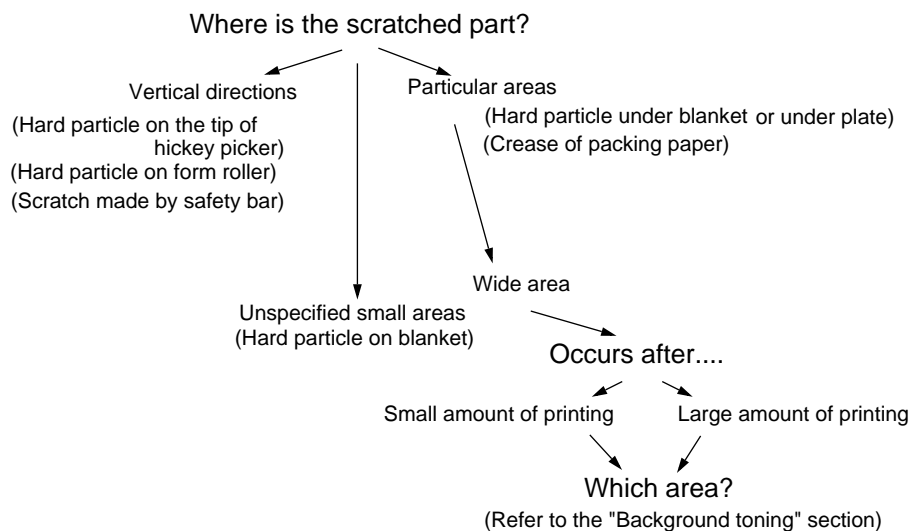
5. Aluminum burr sticking on the plate lock up device.

When the plate is pulled with strong force after being fixed on the plate lock up device, the back side of the plate will be scraped by the plate lock up device and burr will occur. When the plate lock up device is released for plate replacement, that burr might transfer to the blanket and damage the plate. This burr on the blanket will move to the plate, then to the form rollers one after the other, and finally stick to form roller. Resulting scratch will be seen in vertical directions.

A spot toning is seen at first, and will gradually turn into a line. There may be a double line toning when the form roller is unsteady.



How to distinguish the cause of scratches



Emergency Measures



When a scratch is seen in vertical directions, check if there is a hard particle or convex on the safety bar or automatic plate release unit. If there is any, clean the unit or stick a masking tape.



When the scratch is seen after tens of thousands of printings and there is no particular problem on the press, the most thinkable cause is the aluminum burr on the form roller. Check the form roller and remove the burr.



When there are many scratches on the surface of the printed plate, the most thinkable cause is an aluminum burrs which fell off from the plate lock up devise and stuck to the particle removing roller. Exchange the roller and remove the burrs from the plate lock up devise.

Poor tone reproduction



When the size of the dot on the proofing and actual printing is different, the dot density will also differ even when the printing density is the same.



Cause

1. Pre-press: Poor dot reproduction.

Poor tone reproduction is caused by the following causes.

Degradation of the plate performance: Occurs when the plate is exposed to light

Degradation of the processor performance: Causes poor development which leads to missing dots and silicone fringes remaining on the dots. When there are silicone fringes remaining on the dots, those dots will become smaller.

Please refer to "Poor dot reproduction" in this manual

2. Press: Slur and Doubling

The percentage of the dot area on the printing becomes higher when slur and doubling occurs, and the color becomes deep. If the printing is lightened to solve this problem, the density of the shadow area will be too low.

3. Press: Insufficient printing pressure

There is not much difference in the size of the dots when the printing pressure is 0.05mm higher than the standard pressure. On the other hand, when the printing pressure is lower than standard, poor ink transfer occurs. In this case, the density of the printing looks lighter than the actual amount of ink. Too much ink would be served to raise the density of printing which makes the color murky.

4. Ink: Concentration of pigment

Low concentration of pigment in the ink causes dot gain when the printing density is high. High concentration of pigment causes hollow dots when the printing density is low.

5. Ink: Poor trapping

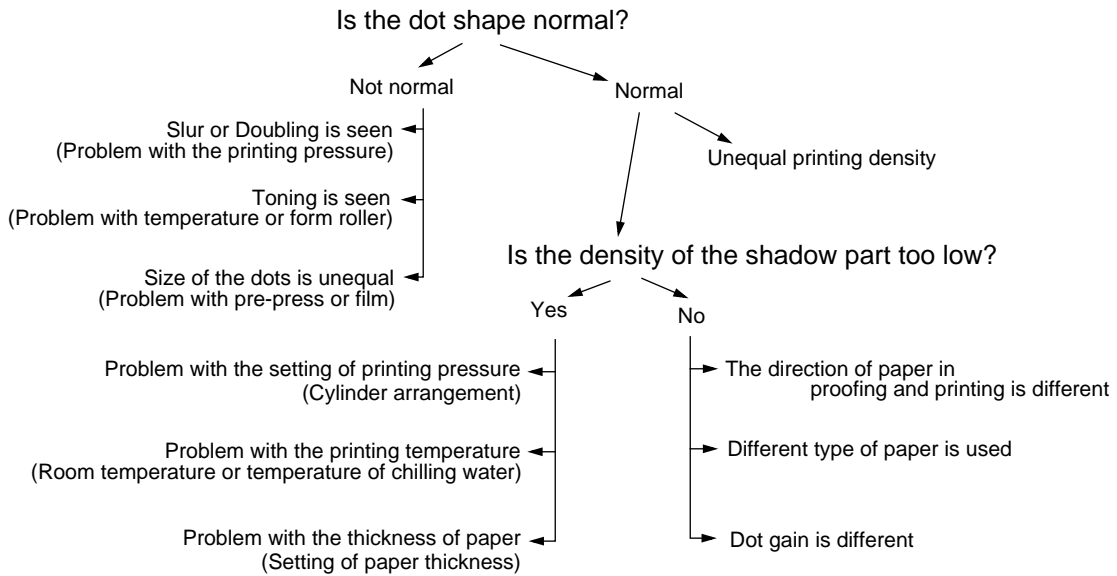
When there is a problem with trapping, the ink density of the latter color must be increased, or the ink density of the former color must be decreased. This will affect the other parts and cause poor tone reproduction.

6. Printing: Printing is out of register

When the printing is out of register, the color on the printing changes, which causes poor tone reproduction. The effect of the poor registration is highest at high screen rulings.



How to distinguish the cause of poor tone reproduction



Emergency Measures



Decrease the exposure level and remake the plate (positive analog plate), or raise the pressure between plate cylinder and blanket cylinder for about 5/100mm when the size of dots must be increased totally.

Poor registration and slur may occur when the pressure is too high. The dot gain will be larger when a soft and smooth blanket is used, and the over bearer is slightly larger than normal.



When the dot size must be decreased or when the contrast must be increased, increase the exposure level and remake the plate (positive analog plates); or use diffusion film and remake the plate.

Dot gain can be decreased by using harder ink.



When the dot size must be partly increased, decrease the exposure level of that particular part (positive analog plates) and remake the plate, or attach a 5~10/100mm paper to the blanket under packing paper of that particular part to increase the pressure.

When partly increasing the paper, immediately remove the attached paper after printing. (When a long run job is printed afterwards, the plate of that particular part would be worn out).

Hickey



Hickeys occur when a coat of ink or paper dust sticks to the plate surface or blanket surface. Apt to occur when the ink tack is high (low temperature or high viscosity). Hickey is distinct when the printing density is low.



Cause

1. Particle in the ink fountain.

When there are many particles (most of them are hardened ink) and the divergence of Doctor Blade is narrow, the particles are hanging on the edge of the blade. In this case, many lines are seen on the ink fountain roller. When the image area increases or the printing density is increased, the divergence of the blade is widened and the particles on the edge of the blade come out into the ink. When these particles reach the plate surface, hickey occurs.

Suddenly occurs in many parts when converting from one job with small image area to another job with large image area.

2. Hard ink coating drop out from the cracked part of a deteriorated roller.

Hard coating drop out from the rider roller

Drop out of particles piling on the particle removal roller.

Occurs when the hard ink coating on the cracked part of the roller or the ink coating on the roller surface drops out during printing.

Happens on and off when the ink tack is high.

3. Hard ink hanging from the ink fountain.

Occurs when the hard ink hanging from the ink fountain blade drops out.

Suddenly occurs in many parts.

4. Paper dust and paper fiber / Particle on waste paper.

Paper dust and paper fiber sticks on the plate surface when paper picking occurs during printing, which causes hickeys. Hickeys also occur when dust is piling on waste paper.

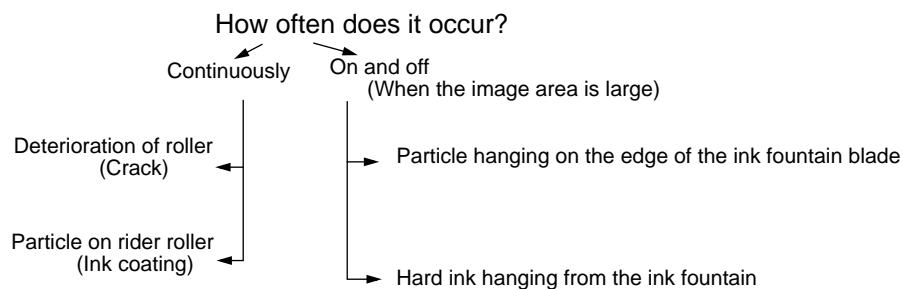
The main cause is paper dust due to paper picking. Occurs right after printing on waste paper.

5. Particles falling from the ceiling.

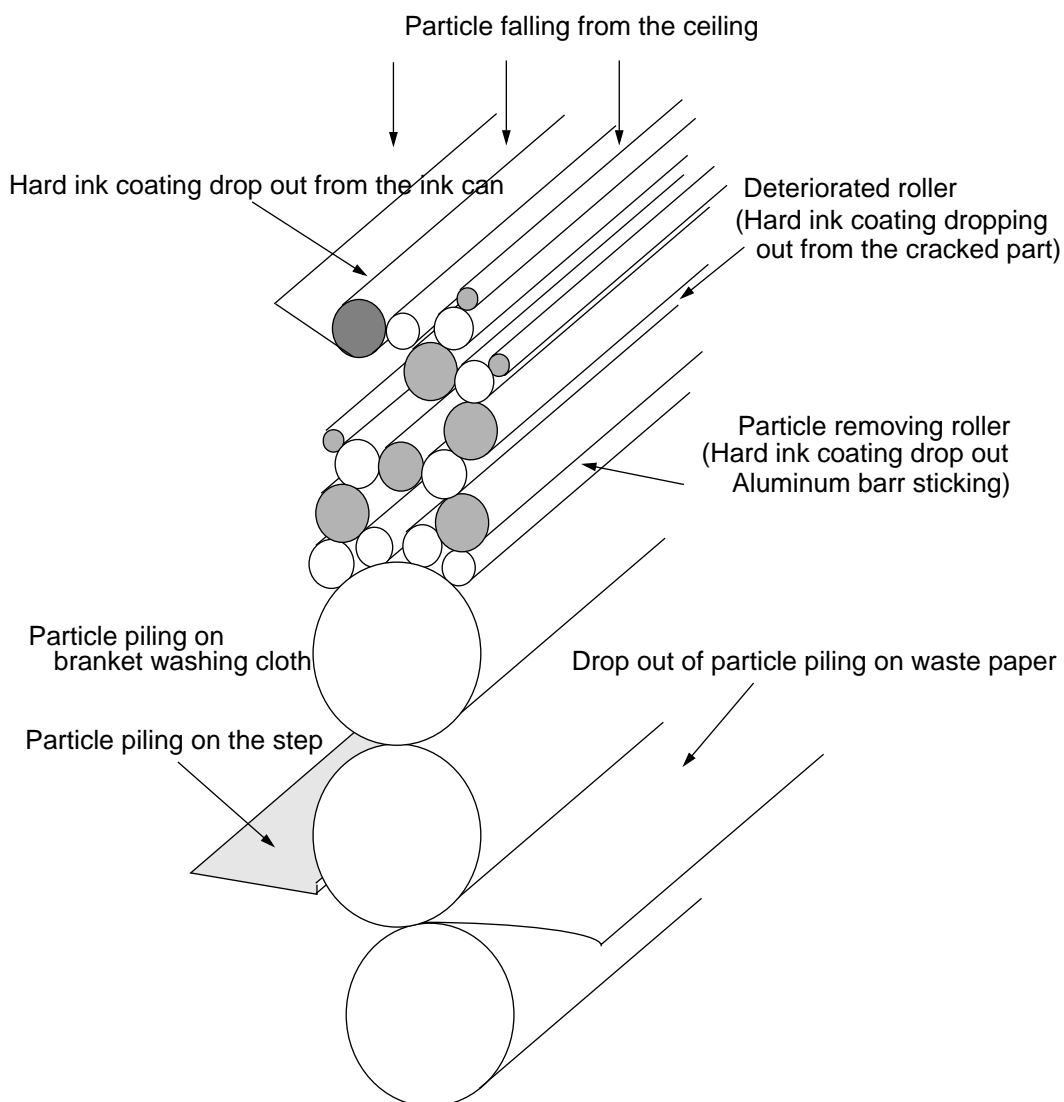
Dust and powder piling on the air duct and lamp above the ink fountain falls in to the ink fountain, and causes hickeys.



How to distinguish the cause of hickey



Cause of hickey





Hickey

Cause Hickeys occur in many places right after converting to a job with large image area

Solution Particle hanging on the edge of the ink fountain drops into the inker when the ink fountain is opened (many lines are seen on the ink fountain roller).

If there are almost no lines on the ink fountain roller, the cause of this problem is the drop out of particles piling on the inner roller of the inker. This happens especially when the rider roller is on the second and third form roller

Cause Small hickeys are seen continuously.

Solution This occurs when there are many particles piling on the rider roller. Sometimes it is caused by particles in the ink.

It is difficult to remove this particle with a hickey picker when the particle is very small. In that case, particle-removing roller should be attached.

Cause Both large and small hickeys are seen on and off

Solution This occurs when there are particles in the ink on the roller. Particles were mixed when the ink was added to the ink fountain.

They are easily removed with a hickey picker when removed right after hickeys occur.

Cause Coating of the paper is peeled off.

Solution Lower the tack of the ink. Wash the rollers when the ink viscosity is high.

When the density of the paper surface is low, first use paper which has a strong surface to spread ink on the blanket, and then start printing with the required paper.

The hickey will be either fibrous or hollow, and not shaped like an eye, which is seen when the hickey is caused by particles.

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