

Concentric Screening

Application Guide

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Contents

1. Copyright Notice.....	3
2. WHAT IS CONCENTRIC SCREENING?.....	5
3. Setting up a Concentric Screen.....	6
3.1. Plate CTP check.....	6
3.2. Single Color Print Test.....	7
3.2.1. Measure the printed Single Color Test form.....	9
3.3. Creating your Concentric Screen.....	12
3.4. Multi-Color Print Test.....	15
3.5. Creating the Press Curves.....	16
3.6. Using in production.....	17
3.6.1. Validation Run.....	17
4. APPENDIX A. Measurement of Relative Chroma.....	18
5. APPENDIX B. Visual clues for Ring and Space.....	20
6. APPENDIX C. Concentric Dot Size and Measurement.....	24

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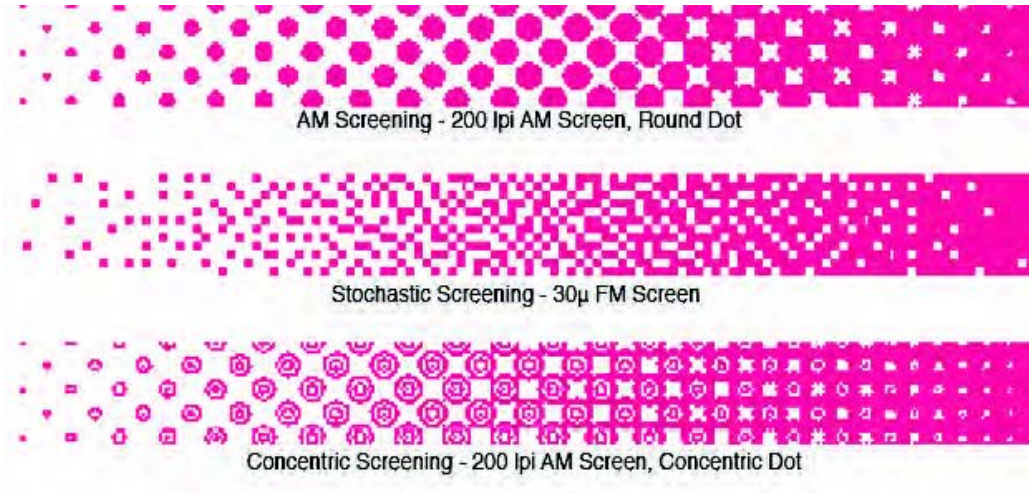
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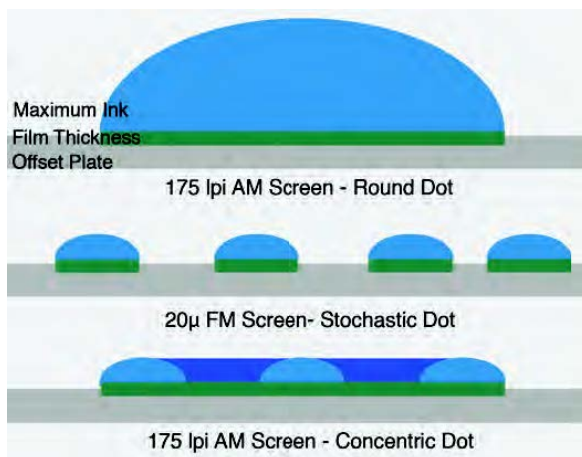
2. WHAT IS CONCENTRIC SCREENING?

Concentric Screening is AM screening in which the round AM dots are divided into thin concentric rings. The purpose of Concentric in offset is to achieve the benefits of stochastic with the smoothness of AM. Stochastic screens contain small spots which are randomly distributed.



The benefits of stochastic are related to the small spot size and not the random distribution. While the small spots of stochastic limit ink film thickness on the offset plate, the random distribution can cause a grainy appearance. By dividing the AM dot into thin concentric rings, similar and sometimes superior ink limiting characteristics are achieved.

This results in higher chroma, cleaner printing, and the ability to print higher screen rulings. There is a dramatic increase in quality and stability.



3. Setting up a Concentric Screen

There are six steps to setting up Concentric Screening:

1. [Plate CTP check](#) on page 6
2. [Single Color Print Test](#) on page 7
3. [Creating your Concentric Screen](#) on page 12
4. [Multi-Color Print Test](#) on page 15
5. [Creating the Press Curves](#) on page 16
6. [Validation Run](#) on page 17



Note: Only Step 2: Running and analyzing the Single Color Print Test and Step 3: Creating the Concentric Screen are unique to Concentric Screening. The other steps are the same as for all other screening methods.

3.1. Plate CTP check

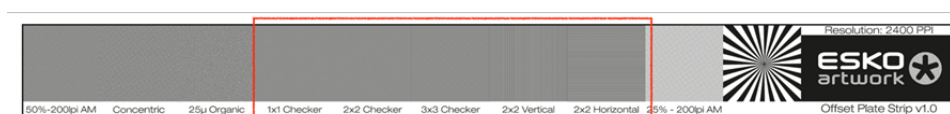
Concentric screening requires a CTP device that can image very thin elements with great precision and stability. To verify the quality of your CTP (focus, zoom, head alignment if multiple...) and the output quality for Concentric screen we advise to perform the following test on your CTP device:

1. Download the files to be imaged from the [Imaging Engine Support page](#).

There are 2 PDF files, one for 2400ppi and another for for 2540ppi. The PDF contains a control strip which is repeated on the plate. You can adapt the PDF if your plate is smaller than 700x1000 as the bitmap control strip in the file will not be affected.

2. Image the `Concentric_OffsetPlate_QCcheck_2400dpi_700x1000.pdf` file with your current plate making workflow, on a large format plate (the file is 700x1000).
3. Inspect the exposed and processed plate:

Verify each control strip on the areas in the red box:



The strip contains checkerboard targets. Their sizes in pixels are 1x1, 2x2, 3x3, 2x2V, 2x2H.

By definition, checkerboard targets are screens which are pattern free. As such any patterning visible in the checkerboard target of your processed plate indicates some imperfection in plate material, imaging, or processing.

Of course, no system is perfect and few systems can image the 1x1 checkerboard with no pattern, but through experience we've learned how to assess plate quality based on these patterns. A plate on which the 2x2 checkerboard shows no patterning can successfully image any Concentric screen. This usually means the press can print the checkerboard and Concentric screen without a pattern, but there are cases where the patterns can be seen on print but not on plate. At a resolution of 2540, a pixel is 10 microns and therefore the 2x2 checkerboard is 20 microns. If you have patterning

in the 2x2 checkerboard, you will struggle to print 20 μ stochastic screens and Concentric Screen with less than 20 μ Rings.

Check if each area (1x1, 2x2, 3x3, 2x2V & 2x2H) has a uniform surface. If patterning is visible, make note of which area the patterning is visible in. It's possible to see banding in few areas. See an example of banding below:



2 x 2 checkerboard



Note: The 1x1 area (10 μ elements) is allowed to have banding. All other areas should look uniform.



Tip:

- We advise to note down the following specifications of your CTP for reference:
 - Imagesetter (manufacturer + type)
 - Processing unit (manufacturer + type)
 - Plate (manufacturer + type)
 - Negative or positive plate
 - Plate size :
 - Software used for plate making (RIP + Tiff catcher + versions)

3.2. Single Color Print Test

The purpose of the Single Color Test is to determine three parameters:

- Screen ruling,
- Ring width,
- Space width.

This is the only step unique to Concentric Screening and is necessary to select and install the right concentric screen suited for your printing condition.

Linearizing your plate

We advise to check if the plate is linear. Even if you don't use a plate curve, we advise to create one if necessary. The process-free plates are an exception as they can't be measured.

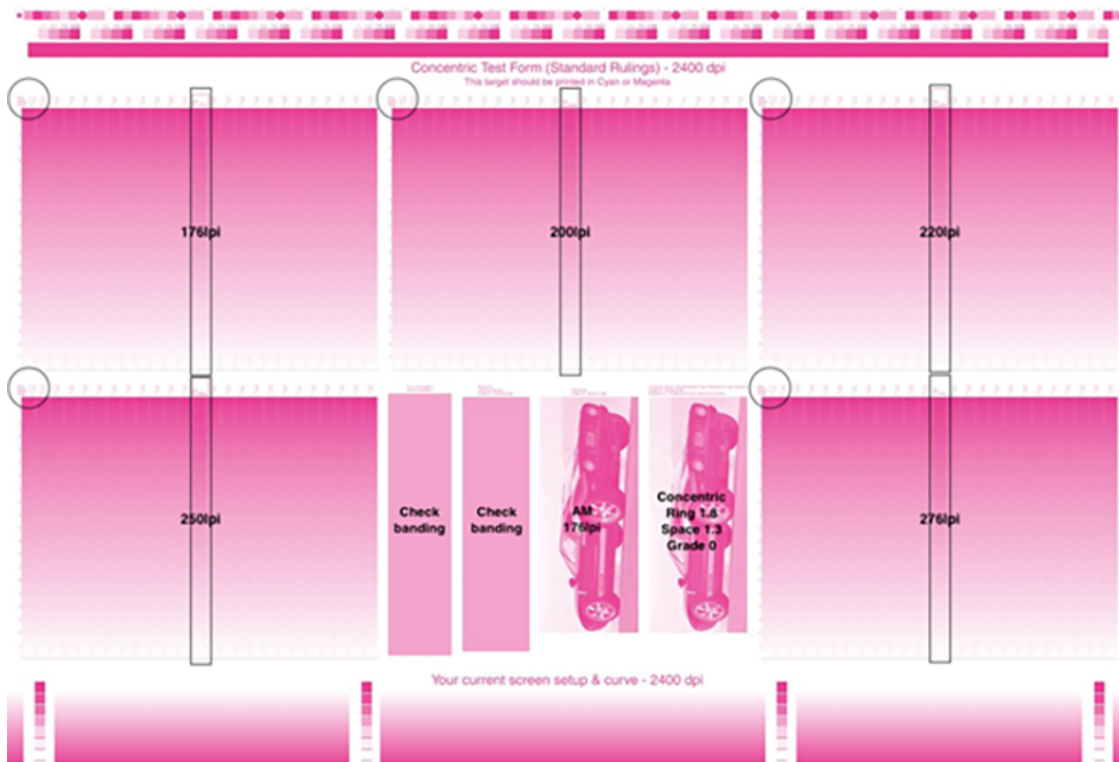
For making a plate curve, please check the Curve Pilot PressSync User Guide here: <https://www.esco.com/en/support/product?id=Curve%20Pilot>

Getting the Test Form

You can download the Single Color Test Form from the [Imaging Engine Support page](#). There are separate zip files for 2400ppi and 2540ppi. Each zip file contains PDF files with one of the following sizes:

- 530 x 750 mm
- 600 x 865 mm
- 1000 x 650 mm
- 1018 x 688 mm

The single color test target is called the Concentric Parameters Form. This is a sample concentric test form in magenta:



What you see in the test form:

- The form contains 5 boxes with concentric screening and each column has different concentric parameters: ring, space and grade settings (indicated with the black circle).
- In the middle of each box there is an AM screen with a specific ruling: 176, 200, 220, 250 and 275 lpi.
- In the middle of the form there are different elements; the 2 at the left are meant to check banding (1x1, 2x2 and 4x4 patterns) and on the right, there are images of the car with an AM screen and concentric screen.
- At the bottom of the test form, you can see your current screen setup & curve.

Output the Plate for Single Color Test

Screened Concentric Parameters Forms can be outputted on any system which supports one bit tiff output.

1. Select the concentric test form file and send it to Imaging Engine with your current RIP ticket.
 - The concentric part has already been screened.

- The bottom part of the test chart is supposed to be screened with your current screen and curve.
 - Ensure that the output resolution matches the resolution of the target.
2. Output the plate using your normal CTP settings and plate material.

Inspect the Plate

Inspect the plate for concentric screens with a microscope to find defects.

- Rings should not have any gaps.
- Spaces should not touch and should always be open.
- Rings should be constant and not have very thick and very thin elements.

If there are defects in the rings or spaces, the plate can be used for this test but we can already conclude that these concentric settings cannot be selected for production. Ring and space defects on plate indicate high risk of instability in production.

Print the Single Color Test Form



Tip: It is advised to print in magenta as it is usually more unstable than cyan. In magenta, you can already see differences between the ink manufacturers unlike cyan plates.



Tip: We advise to note down the following print conditions:

- Type of press, inks used, substrate, etc.,.
- Average paper wasted during set up

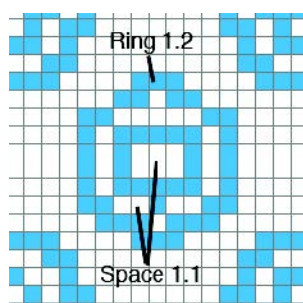
Ensure that the solid is satisfactory by comparing dE to references like ISO. Start with the current density.

Run at different densities ranging from too low to too high and collect 10 sheets per density.

3.2.1. Measure the printed Single Color Test form

Select Ring & Space Widths

The main part of the Concentric Parameters test form consists of vignettes with different combinations of Ring and Space Widths.



The Ring is the ink coverage part of the dot and the Space is the non-ink coverage part of the dot. Numbers are in pixels.

The Ring shown above is 1.2 pixels thick, the Space 1.1 pixels thick. Of course in the digital world, you can't have 2/10 pixel (as in 1.2). The number 1.2 indicates that if you count the width of Ring, most of it will (80%) be 1 pixel thick and some of it (20%) will be 2 pixels thick. The same rule applies to the Space.

The Basic Rule of Ring and Space Selection

The general rule for choosing a Ring and a Space is to just pick settings that look good. In some cases, the results are all similar. Then you should use the thickest Ring and thinnest Space. More often, there are differences.

Some users like to simply judge by eye which Ring and Space to choose. Usually their choices are not far from optimum. Guidelines for looking at Concentric Dots with a magnifying glass are described in Appendix B (see [APPENDIX B. Visual clues for Ring and Space](#) on page 20).

Others prefer a more objective approach. that's what we advise as well. The objective approach, also known as the Chroma Approach, will be described below, with more information in Appendix A (see [APPENDIX A. Measurement of Relative Chroma](#) on page 18).

The Chroma Approach

Optimum Ring and Space settings can be determined objectively by using a spectrophotometer and comparing LCH values. The basic rule is as follows: Use the Ring/Space combination which produces the maximum Chroma.

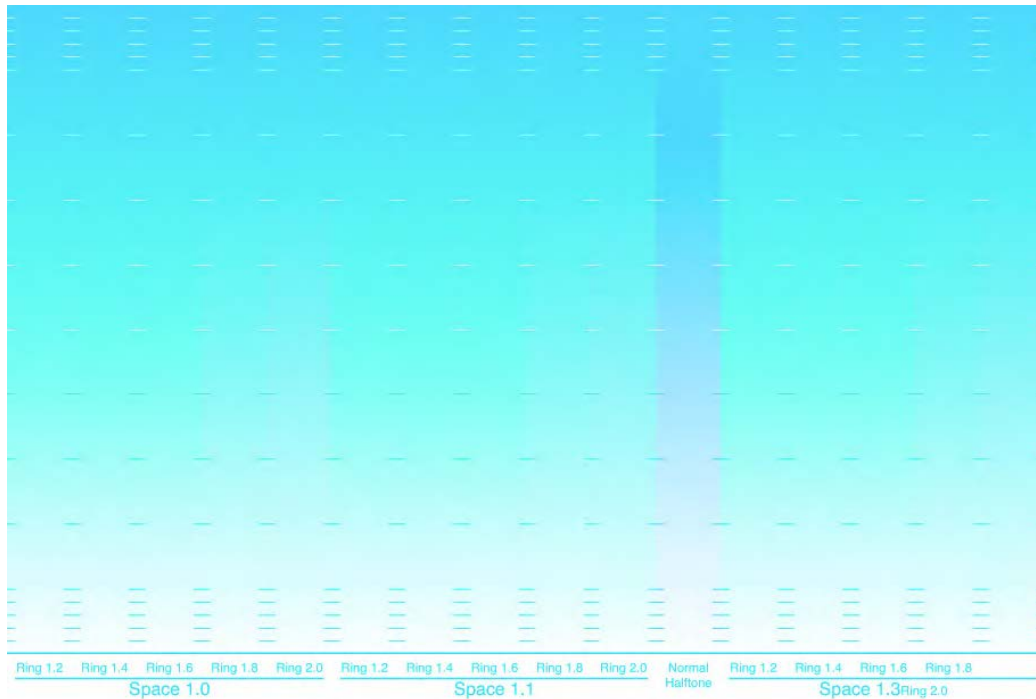
- **Space Rule: Thinnest Space for Same Chroma**

The Space serves no real visual purpose. Its purpose is mechanical - to divide the dot on the plate and thereby limit ink film thickness. Therefore, you need no more Space than is required to assure the Rings remain disconnected on the plate. Put more simply, if you get the same Chroma with a Space of 1.1 as with a Space of 1.3, go with the Space of 1.1.

- **Ring Rule: Thickest Ring for Same Chroma**

There is often a Ring width below which using a thinner Ring does not produce a thinner ink film. Below this point, thinner Rings just put an unnecessary burden on plate material, CTP device, and plate processing quality and produce no corresponding improvement in print quality or press stability. Put more simply, if you get the same Chroma with a Ring of 1.6 as with a Ring of 1.2, go with the Ring of 1.6.

The image below shows the Lightness and Chroma levels for relevant Ring and Space combinations.



First measure the midtone (first dark tick mark) of the normal halftone screen. In this case, it produced a Lightness value of 72.3 and a Chroma of 31.4.

The Concentric Effect can be thought of as the increase in Chroma at the same Lightness value. The maximum Chroma is always at the minimum Ring. Comparing the minimum Rings (1.2) at all three Spaces (1.0, 1.1, and 1.3) it can be seen that the Space of 1.1 produces the maximum Chroma and is therefore the optimum choice of Space.

Now we compare the Ring widths at a Space of 1.1. While thicker Rings won't produce greater Chroma, they may produce the same Chroma. Notice that Rings of 1.2, 1.4, and 1.6 all produce a Chroma of 35.2 at a Lightness of 72.3 but that the Ring of 1.8 reduced the Chroma to 34.4. The optimum choice is therefore Ring 1.6. Going thinner in Ring width produces no benefit.

See [APPENDIX A. Measurement of Relative Chroma](#) on page 18 for a more thorough description of LCH.

Visually check the print result

After measuring using the chroma approach and having a good selection for the concentric screen, you can visually check the following on the print result:

- Collect a sheet with correct dE compared to tolerance
- Check for banding on the print like on the plate.
- Verify if the dots of the selected zone are satisfactory. Ideally the printed dots looks like a circular dot where no rings are visible anymore. If they are still visible, at least they should be closed (not interrupted).
- Verify that the selection is stable even on sheets with very low or very high density.



Tip:

- Most of the time, for cardboard, for positive plate: you get a ring of 1.6 or 1.8 and a space of 1.1 – 1.3
- Our experience shows that bigger spaces generate more TVI. Something to check during other concentric setups. So always also check TVI to see what values are best. The ring and space that generate the lowest TVI are the best choice.
- If you are confused between 2 values in ring it's better to select the highest ring value as it is more stable, safe and has a bigger tolerance on plate.
- If you have multiple choices (because of equal Chroma), then the rule is to select thickest ring and smallest space. Selecting the thickest ring has the following benefits:
 - it reduces 'range'
 - it has different transition point in highlights from concentric to classic dot. E.g., 2.0 and 1.1 is less concentric and has more classic dots in highlights
 - it can be easily viewed and tested in ScreenManager
 - it is better to have maximum concentric for stability
- Note that the applied curve will also influence this a lot.



Tip:

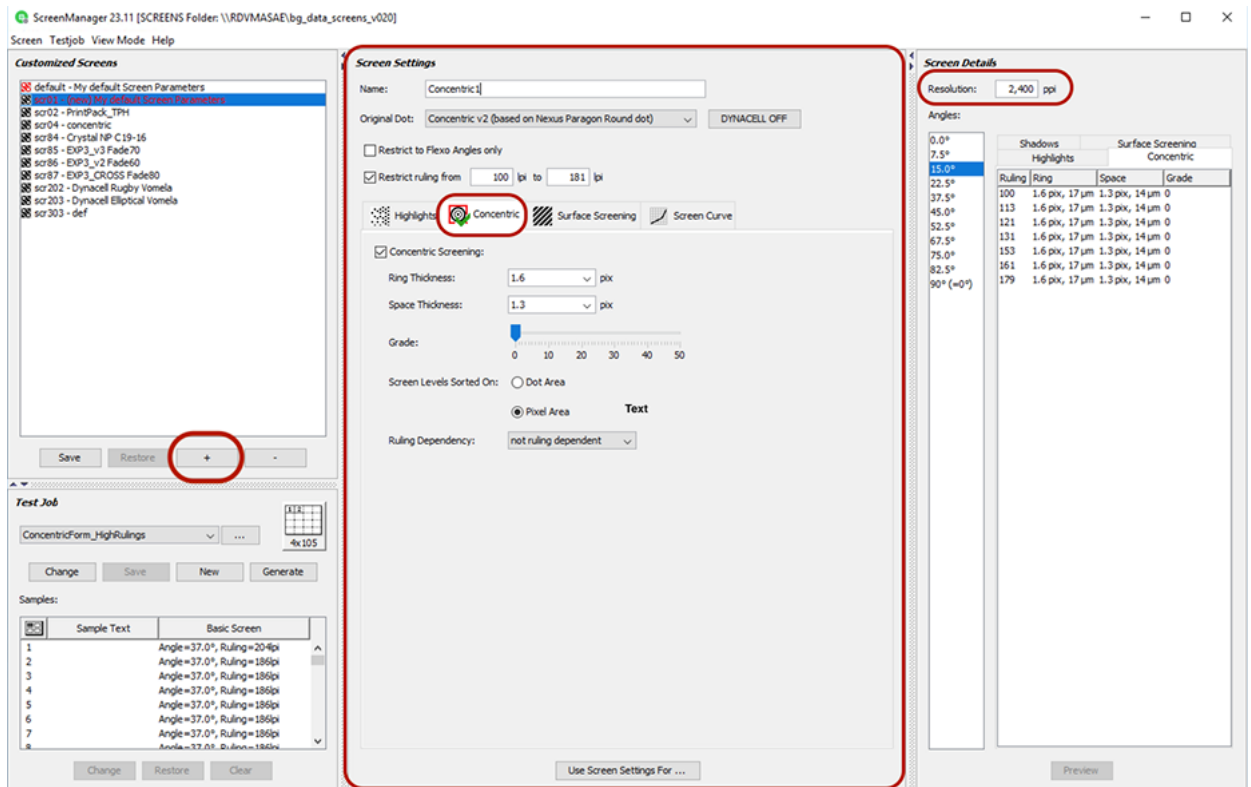
Ring quality is less influenced by press and mostly depends on plate
 Space quality depends on water balance on press

3.3. Creating your Concentric Screen

The Concentric screen is a custom screen created in ScreenManager. Custom Screens have a short name beginning with SCR (SCR01, SCR02...).

If you don't have ScreenManager installed yet, please install it after you have activated your license for ScreenManager and Concentric Screening. ScreenManager is an application part of the Imaging Engine installer. You can install ScreenManager on any server or client, check the system requirement page on the Esko portal.

Creating the Concentric Screen in Screen Manager



1. Open the ScreenManager application by clicking the shortcut on your desktop.
2. In the Customized screens pane, click on the + button to create a new screen.
3. Fill in a name for the screen.
4. Go to the **Screen settings > Concentric** and enable **Concentric Screening**.
5. The **Original Dot** will change to **Concentric v2 (based on Nexus Paragon Round dot)**.
6. Deselect the **Restrict to Flexo Angles only** checkbox .
7. Define the ruling range you need (the bigger the range, the longer it will take to write the screen tiles).
8. Set the correct resolution in the **Screening details** pane.
9. Based on your analysis of the print, set the
 - Ring thickness,
 - Space thickness and
 - Grade (we advise to use the default grade 0).
10. Screen levels sorted on Pixel area.
11. Set "not ruling dependant".
12. Click on **Save**.

Screen tiles are saved in the screenfolder on the Automation Engine Server (if Screen manager is connected with your AE server), refrain from using Imaging Engine while this happens

Using the Concentric Screen in Imaging Engine

Once your screen is installed, you will now see the screen with the screencode in the Imaging Engine tasks:

- In **Dot**, select
 - **Use from file** for **All** in case of object based screening or

- set the **Default Screen Dot** to your Concentric Screen (the name starts with SCRxx)
- Select the right Resolution, Ruling and Angles

Settings for Step: Image to Screened Separations

Device: Imaging1

Printing Condition: None

Selecting a Printing Condition will influence some settings.

Seamless screening

Use From File: None

Default Screening Settings

Dot: SCR04 → concentric

Angle Set: Offset

Ruling: 200 lpi

Plate Curve: None

Use press curves from file

Default Press Curve: None

Preview:

Ink Name	Ink Book	Ink Ind...	Spot Ink In...	Dot	Ruling	Angle	Press Curve
Cyan	process	1	-	SCR04 → concentric	200 lpi	15°	None
Magenta	process	2	-	SCR04 → concentric	200 lpi	75°	None
Yellow	process	3	-	SCR04 → concentric	200 lpi	0°	None
Black	process	4	-	SCR04 → concentric	200 lpi	135° (=45°)	None

Original separation settings are displayed in grey, modified settings in black, custom values are displayed in italics. To modify a screen setting of a separation, click the dot, ruling, angle or press curve value.



Note: You can use the following options:

- Save Print Simulations (.view files)

Print simulation files look like the screened files you are making for production, but with the advanced screening effects removed (which Concentric is using), so you can open them in the Bitmap Viewer and check exactly how your output will look like.

- Make all output files ready for viewing



Note: To avoid moiré, the Imaging Engine will slightly change the ruling for the separation on 0° or 90°. This is the case for Paragon screens which the Concentric screen is based on. So in most cases, Yellow will have a slightly different ruling than the other separations, as Yellow is normally outputted on 0°/90°.

For more information on Imaging Engine settings, please check: [Imaging Engine Product Documentation](#)

3.4. Multi-Color Print Test

Once you have determined your optimum Screen ruling, Ring width, and Space Width and you've installed your Concentric with these parameters, setting up Concentric Screening is the same as setting up any other type of new screening. If you have your own procedures, or follow industry guidelines such as ISO or GRACoL 7, use them with Concentric Screening the same as with any other screening. Alternatively, follow the procedures detailed described in the CurvePilot/PressSync User guide: <https://www.esko.com/en/support/product?id=Curve%20Pilot>

The purpose of printing the multi-color test form is to define the press curve(s) and see the difference between your concentric screen and a conventional AM screening.

Creating the Multi-color Test form



Tip:

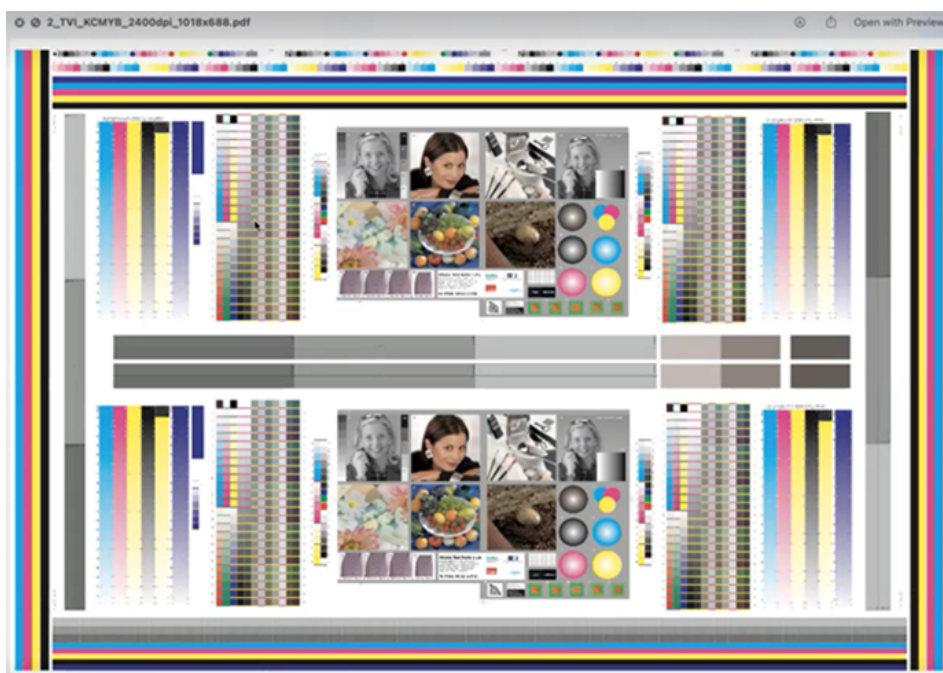
It is recommended to use a TVI test form containing the following:

- Color wheels
- P2P chart or P2P25 chart
- 2 line strip (Fogra strip from PressSync)

It is recommended to use an Altona test form, as this contains all elements. If you use another chart, make sure to add the 'color wheels' (gradient per ink in a circle). You can check if the gradients print ok and it shows if mottling is causing an issue.

It can be a four color chart, but spot colors can also be added.

Below is a screenshot of a Multi-color Test Chart:



The upper and lower part are a copy of each other, but containing different screen settings using object based screening. Use an editor like Artpro+ to create 2 screen sets and apply it on the different objects.

- Upper Part: set in currently used screen (AM or previous concentric)
- Lower Part: set in new concentric screen (created in previous steps)

Using this method, you can evaluate if your selection of the concentric screen is good. In this 2nd run, we can already see the benefits/improvements of Concentric. Certain issues can be detected already in this print run before printing the validation.

Rip the Multi-color Test form

Once your PDF with object based screening is ready, you can send it to Imaging Engine.

Make sure to set following parameters in the Imaging Engine task:

In the **Separations** tab:

- Screentype (Dot): Use from file (in case of object based screening) or set the Default Screen Dot to your Concentric Screen
- Angle set
- Ruling
- Press Curve and Plate Curve
 - Plate curve: the plate curve to linearize your plate (see [Single Color Print Test](#) on page 7)
 - Press curve: None

In the **Rendering** tab:

- Resolution

Check the plates

Verify on the plate (or even before that, on the TIFF output files) if the correct screen and curves are applied. Also verify if the CTP is still behaving correctly like you have verified in step 1. You can easily do so by using a microscope or camera and checking the screen dots and verifying the 50% dot.

Print the Multi-color Test form

Check if you can see

- slur
- mottling
- more than normal dotgain
- big inbalance between CMY

3.5. Creating the Press Curves

Once you have run the multi-color test, you are ready to create curves. You can use procedures or software that accompany systems like ISO or GRACoL 7 or simply measure the single color dot gain vignettes. Either way, you will ultimately be entering the data into Curve Pilot to use with Imaging Engine.

These procedures are detailed described in the [Curve Pilot PressSync User guide](#) and the [Imaging Engine User Guide](#)

3.6. Using in production

Print the multi-color test form again with the press curves (created in the previous step) applied. This is to validate your setup of Concentric Screen.

Make sure to set following parameters in the Imaging Engine task:

In the **Separations** tab:

- Screentype (Dot): Use from file (in case of object based screening) or set the Default Screen Dot to your Concentric Screen
- Angle set
- Ruling
- Press Curve and Plate Curve
 - Plate curve: the plate curve to linearize your plate (see [Single Color Print Test](#) on page 7)
 - Press curve: the curve created after measuring (see [Creating the Press Curves](#) on page 16)

In the **Rendering** tab:

- Resolution

In the **File Output** tab:

- File type: TIFF or PDF

3.6.1. Validation Run

Check if the concentric screen has a better print result compared to the AM screen; check if the gradient is better. It should be more pure and saturated and it should be smoother (less grain or tonal jumps).



Tip:

Print at least 1000 sheets, place many sheets in cascade on top of each other and visually compare. If you use a measuring device on the press, this might indicate differences although visually no difference can be notified as printing with concentric is very stable during the print run.

Optionally, measure the strip in your presssync curveset to validate that the curves are correct by using the verification module in PressSync. For more information on verification, see the [Curve Pilot User Guide](#)

4. APPENDIX A. Measurement of Relative Chroma

Overview

By using a spectrophotometer to measure LCH values, you can determine optimum Ring and Space Widths.

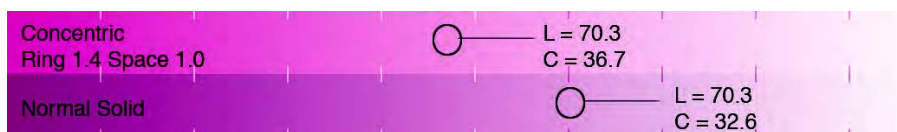


LCH is the same as LAB except that the A and B have been converted to C (Chroma) and H (Hue). For this analysis, we are interested in C and can ignore H.

All modern spectrophotometers and software offer LCH. The many other settings on the Spectrophotometer (Illuminant, Observer, etc.) are less relevant - as long as the same settings are used throughout the analysis below.

What is Chroma?

Chroma is the colorfulness of a color. The higher the Chroma, the more pure the hue. With respect to the vignettes shown below, the vignette with the Concentric Screen has a higher Chroma than the one with the normal screen. It looks more colorful.



Another word for Chroma is Saturation. However, in the press room, the term saturation is often used to describe ink level. Chroma is less ambiguous.

What is Relative Chroma?

Comparisons of Chroma values between two screens are only valid at equal values of Lightness. This is because Chroma is proportional to Lightness.

Of course, you can change Lightness by applying a curve in prepress. However, such a curve will not change the Chroma value for a given Lightness value.

So the relevant numbers for a comparison are the Chroma values at the same Lightness value.

The Procedure

Measure the Lightness (L) and Chroma (C) values of the Normal halftone dot at 50%. This is the first dark tick mark on the vignette.

In the example below, the 50% digital dot produced an L of 70.3 and a C of 32.6.



Now, to analyze a Concentric vignette, search up and down the vignette to find the same L (in this case 70.3) and record the C. If the C is higher than that of the normal halftone vignette at the same L, then there is a Concentric Effect. You don't have to measure what you have already eliminated on plate.

Search all Rings and Space combinations using a similar analysis. The Rings and Space with the greatest Concentric Effect are the optimum values to use in production.

Generally, you need to select the ring and space that generates the highest C value but also check the following:

- Ensure that you don't go beyond the ISO C value, otherwise it could be too saturated.
- Check visually if the printed data is good
- Check if stable ring and space could change because of CTP.
 - Check with approximately same C value with different ring and space
 - Check if TVI doesn't change a lot if you go up and down in ring and space. Do this by marking the position where you measured L and C value in each gradient.
- Check if the gradient looks good. The dots should not drop in the highlights.
 - If you measure 30% and it already is at 5%, that is not good.
 - Check what ring and space will not force you to create a heavy compensation curve as it will lead to loss of detail.
 - You can also do the same test as done with the 30%, but now using 50% to see what dot will give a stable TVI.
- Check visually if your selection behaves the same way in sheets printed with other densities as well.

5. APPENDIX B. Visual clues for Ring and Space

The best way to judge Ring and Space selection is by measuring LCH values (see [APPENDIX A. Measurement of Relative Chroma](#) on page 18). In cases where you don't have access to a spectrophotometer, you can use visual techniques.

- **Magnification**

To critically view Concentric dots, you will need a magnifying glass with 25x or higher magnification.

- **Screen Ruling**

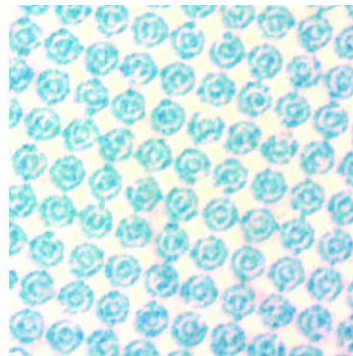
The analysis and results will be the same regardless of which screen rulings you are observing. The examples shown are 200 lpi screens.

Example 1 - Plate with Sharpening

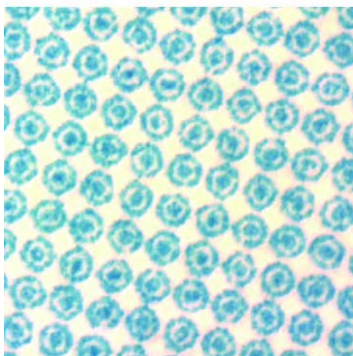
The print samples below are taken from a positive working plate with sharpening.



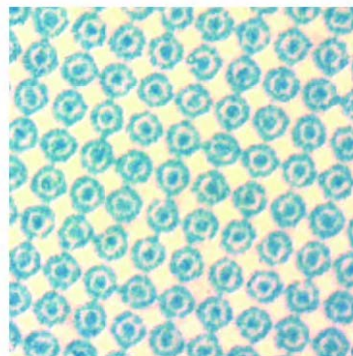
Ring 1.2 - Space 1.0



Ring 1.4 - Space 1.0



Ring 1.6 - Space 1.0



Ring 2.0 - Space 1.0

- **Space Analysis**

First, take your magnifying glass and look at any of the vignettes with a Space of 1.0. If they all have a discernible Space, then there is no need for a thicker Space.

In the examples above, the Space of 1.0 is clearly thicker than needed to keep the Rings separate on plate. A thinner Space would work, however, there is no Space less than 1.0 (1 pixel), so the decision is simple: go with a Space of 1.0.

- **Ring Analysis**

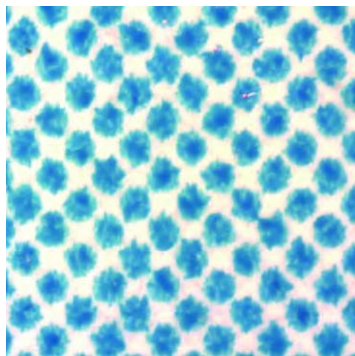
Now look at the Ring widths. The goal is to have no Ring breaks. Rings of 1.2 and 1.4 have extreme breaks and are not worth considering.

The Ring of 1.6 has an occasional break and would likely work OK in production, however the Ring of 2.0 is safer still. LCH analysis would likely reveal no loss of Chroma with a Ring of 2.0.

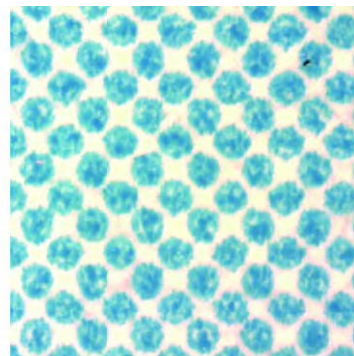
The reason for the thin Rings and thick Spaces on this example is that this is a positive working plate, which actually sharpens in imaging/processing. In the final print, it can be seen that a 2 pixel (20 micron) Ring is thinner than a 1 pixel (10µg) Space. This indicates that the Ring thinned more than 5 microns (to less than 15µg) and the Space thickened more the 5 microns (to more than 15µg).

Example 2 - Plate with Gain

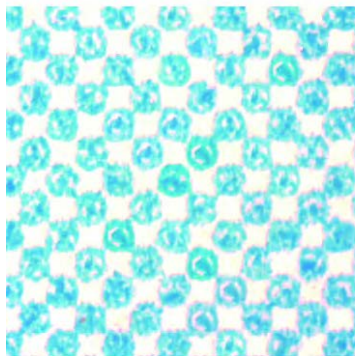
The print samples below are taken from a violet plate with gain.



Normal Halftone (Solid Dot)



Ring 1.2 - Space 1.5



Ring 1.2 - Space 1.7



Ring 1.2 - Space Open

- **Space Analysis**

First, take your magnifying glass and look at any of the vignettes with a Space of 1.0. If they all have a discernible Space, then there is no need for a thicker Space. If there is no discernible Space, view the next higher Space (1.1). Continue to move up in Space until a discernible space can be observed.

In the example above, we had to go all the way to a Space of 1.5 to even discern that there was a difference between the Concentric Dot and the normal Solid Dot. The Space of 1.5 creates a dot that is lighter and cleaner than the Solid Dot. Selecting this Space would provide a significant benefit.

However, a slightly more discernible Space tends to provide an even greater benefit. The Space of 1.7 probably has more space than is needed, but is the next increment up from 1.5. Given this choice, the Space of 1.7 is likely the better choice.

Shown just as an example is a Space Open. This is the thickest Space that can be used. However, its results are not as good as the Space 1.7.

- **Ring Analysis**

The Ring of 1.2 produces a thicker Ring than necessary and shows no sign of breaking. As such, there is no need to look at thicker Rings. We might actually benefit from thinner Rings, but Ring 1.2 (about 1 pixel thick) is the thinnest Ring available.

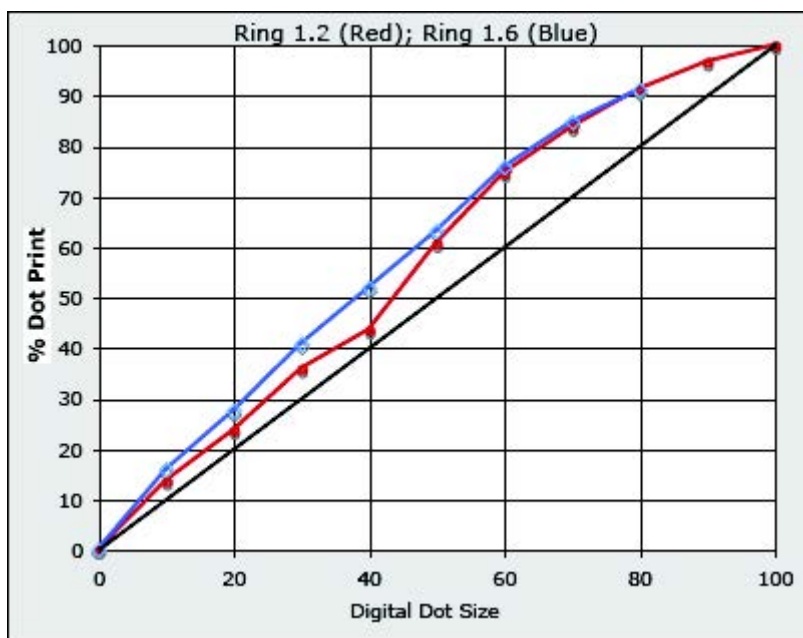
The reason for the thick Rings and thin Space on this example is that this is a violet exposed plate in which the spot size is greater than the resolution grid. In the final print, it can be seen that a 1.2 pixel (roughly 10 micron) Ring is thicker than a 1.7 pixel (almost 20µg) Space. This indicates that the Ring thickened more than 5 microns (to more than 15µg) and the Space thinned more the 5 microns (to less than 15µg).

The Abrupt Transition

A visual clue of Ring width best observed by the eye from normal viewing distance is the sudden jump in the vignette near the midtone.



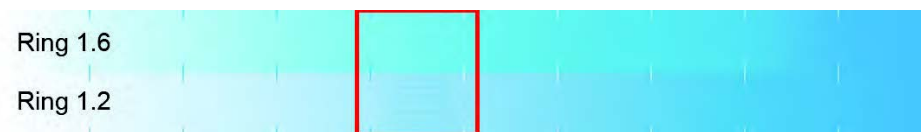
In some cases - notably where there is sharpening occurring on the plate - a Ring width that is too thin will result in an abrupt bend in the curve plot, and hence an abrupt transition in a blend or an image.



This indicates that the Ring is too small. The thin Rings described on Example 1 - Plate with Sharpening on page 13 would likely result in such a transition. By increasing Ring Width, the curve can be made smooth and the abrupt transition eliminated.

Patterning

Another visual clue of Ring width best observed by the eye from normal viewing distance is patterning in the midtone. Rings that are too thin can sometimes break and form patterns.

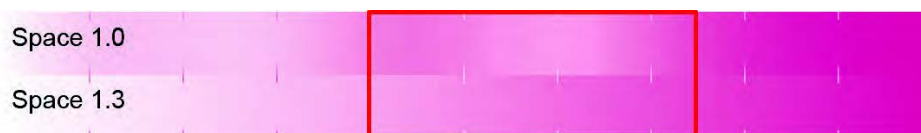


Many times, these patterns can be eliminated by increasing Ring width. Observe the printed Concentric Parameters form to see if increasing Ring width eliminates the patterning.

If it doesn't, that specific screen ruling has a conflict with your CTP device/plate material. Choose a different screen ruling which does not show patterning, and stay in touch with Esko. We are constantly improving our screens as we learn of such conflicts and will make new screens available periodically.

Waves

A visual indication of Space being too thin is a wave pattern.



While this seems to be rare, there are occasions where this pattern has occurred, and has been eliminated by increasing Space width.

A simple test of this is the ask the pressman test. Show the vignette to a pressman and ask "what would you do on press to fix this?". If their answer has something to do with increasing water, then it is likely that these waves can be eliminated by increasing Space width.

Optimum Space Rule

As of the time of this writing, the rule is to use as large of a Ring as possible and as small of a Space as possible - while getting maximum Chroma.

However, there is an exception concerning the Space, in the case of a wave pattern problem. While multiple Ring widths may produce the same Chroma, there is usually one Space width at which Chroma is maximized. On the thinner Space side of it, Chroma falls off radically, while on the thicker Space side, it falls off slowly. Users with the wave problem like to err on the thick Space side.

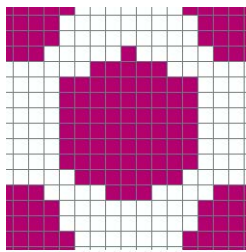
6. APPENDIX C. Concentric Dot Size and Measurement

Dot Area vs Pixel Area

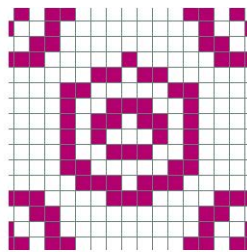
There are two ways to express the size of a halftone dot:

- dot area,
- pixel area.

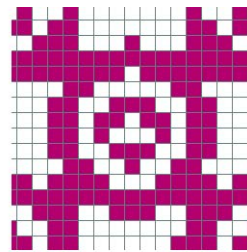
For normal halftone dots, these are the same. The normal dot below has both a 50% dot area and a 50% pixel area. For Concentric dots, they are different. The middle Concentric dot has a 50% dot area and a 29% pixel area; the right Concentric dot has a 74% dot area and a 50% pixel area.



50% Normal Dot



50% Dot Area



50% Pixel Area

While the question of whether to use dot area or pixel area for normal solid dots has never been addressed (as they are the same), the question must be addressed for Concentric. Theoretically, either one will work as long as you are consistent. For numerous reasons, we use pixel area for expressing Concentric Dot sizes in Offset and dot area for expressing Concentric sizes in Flexo.

Does Concentric Have More Gain on Press?

Offset printers are occasionally alarmed when they see a Concentric press curve with more gain than that of a normal screen. The reason for this is that dot areas have been expressed in pixel area.



The midtone has a dot similar to the 50% pixel area, and therefore prints darker than a normal 50% dot (but not nearly as dark as a normal 74% dot). This should be of no concern and will be adjusted through curves in prepress. Also note that while one bit tiff viewers such as Bitmap Viewer accurately quantify Concentric pixel area, they sometimes get confused with angles and frequencies. To measure the angle or frequency of a Concentric dot, use a highlight dot.