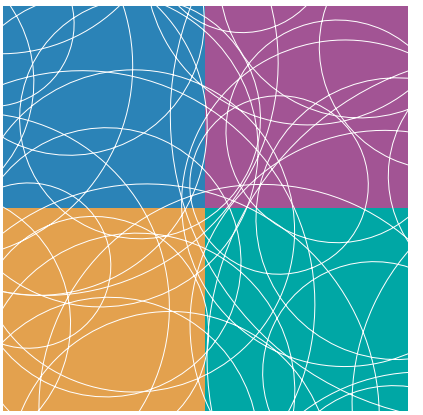
SCREEN
MEDIA TECHNOLOGY

Spekta

Technical Guide



A Revolutionary Screening Method for the Digital Age

Dainippon Screen's Spekta is an innovative hybrid screening method that eliminates moiré and broken lines and delivers print quality and detail comparably to that achieved with 300+ line high-frequency screening, all without the need to make special changes to existing conventional print management facilities. Spekta provides high-end print quality using standard CTP equipment.

What is Spekta?

Characteristics of AM and FM Screening

The digital revolution has brought a sea change to the prepress world, but the nature of the final printed product has hardly changed at all. Most color print matter with strong visual elements, such as brochures, pamphlets and magazines, is still printed using the same conventional 175 lpi Amplitude Modulation (AM) screening methods that were used before the digital revolution.

Conventional AM screening reproduces light and darkness by varying the size of halftone dots. It is currently the screening method used most often in printing, because the pitch and angle of the dots are fixed, and the method achieves consistent tonal reproduction.

Nevertheless, AM screening has drawbacks. Because the halftone dots are evenly spaced and at angles, AM screening is prone to moiré resulting from factors such as plate misalignment and interference patterns between screen angles and images. Other typical problems include jaggedness and segmenting of fine lines and tone jumping in gradation areas. These kinds of problems are particularly troublesome because they are generally not detectable prior to printing. These problems have also hindered the transition to fully digital workflows, the adoption of computer-to-plate (CTP), and the streamlining of the color proofing process. Efficiency-boosting measures such as direct digital color proofing, or using a color printer for proofing, remain problematic because of the risk of overlooking problems such as moiré.

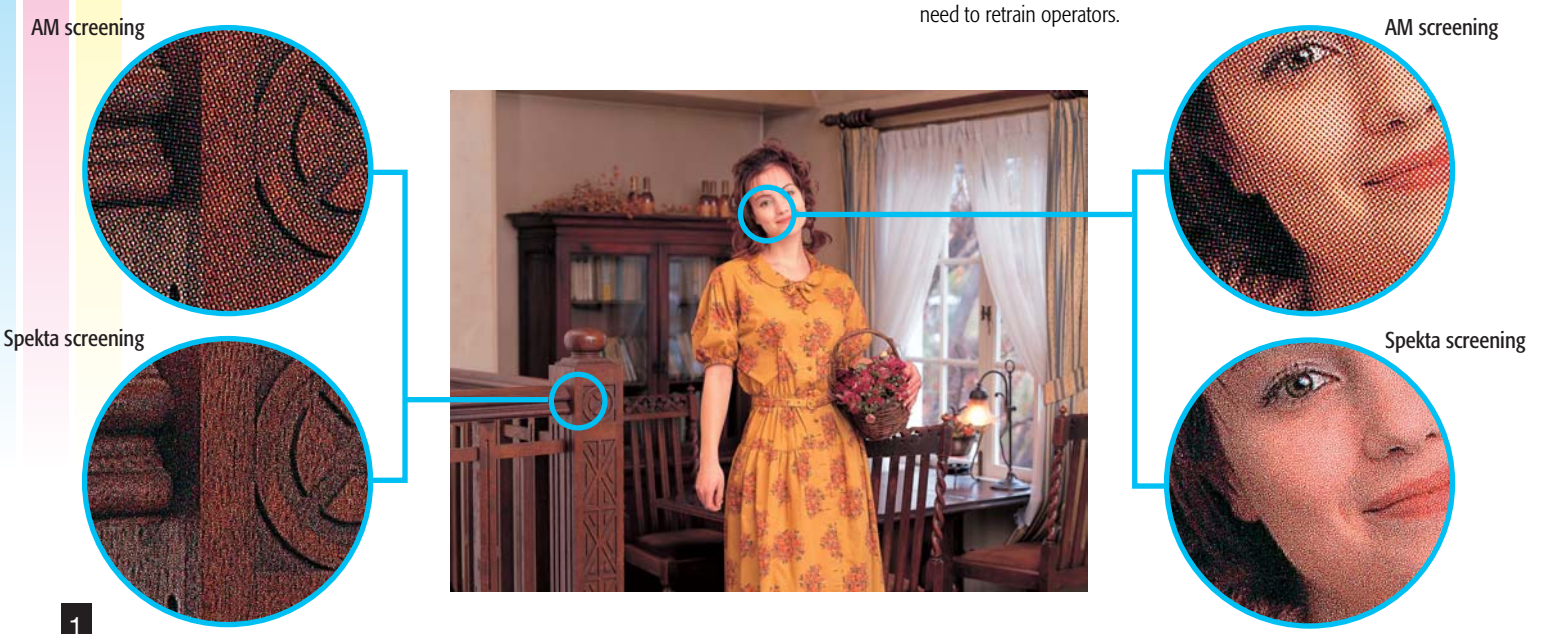
Trying to achieve higher print quality by using higher frequency AM screen rulings also has drawbacks, since printing with high-frequency screening requires much stricter print management conditions. This is why only a small minority of printers use high-frequency screens of 300 lpi or higher. And despite the spread of powerful graphics software that makes it simple to generate high-resolution data, the most common screening method in use, 175 lpi AM screening, leaves the graphic arts industry largely unable to get the most out of its detailed graphics and images.

Frequency Modulation (FM) screening spent some time in the limelight as an alternative to conventional AM screening. FM screening places microdots of equal size randomly, varying their density to reproduce lightness and darkness. Not only does this approach eliminate the moiré and broken lines associated with AM screening, it also supports higher resolution printing. Unfortunately, FM screening demands a rigorous print production environment, which translates into higher printing costs. Also, in comparison to AM screening, with FM screening it is more difficult to print midtones and shadow areas consistently, and the midtones and highlights tend to appear grainy. Despite its other advantages over AM screening, FM screening's own drawbacks have kept it from being more widely implemented.

Spekta: Combining the strengths of AM and FM screening

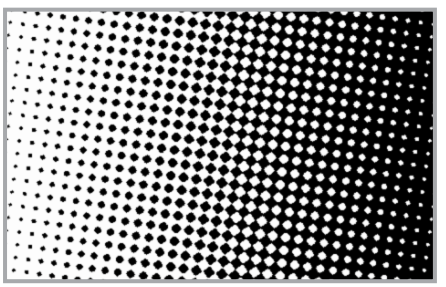
Dainippon Screen has taken the best qualities of both AM and FM screening, and melded them together in an innovative hybrid screening product, Spekta. Spekta overcomes the weaknesses of both FM and AM screening, while delivering their key strengths, to make highly-detailed, high-quality printing a reality using ordinary equipment. It uses AM-like dots or FM-like dots depending on the color density of each area being output. By doing so, it achieves the following remarkable characteristics:

1. With the standard 2,400 dpi resolution that is typically used to output 175 lpi AM screens, Spekta achieves a level of detail comparable to high-frequency line screens of 300 lpi or higher. Moreover, it produces no jagged or broken lines.
2. Spekta screening does not generate moiré because it creates no screen angles.
3. It can be printed under standard printing conditions and there is no need to retrain operators.

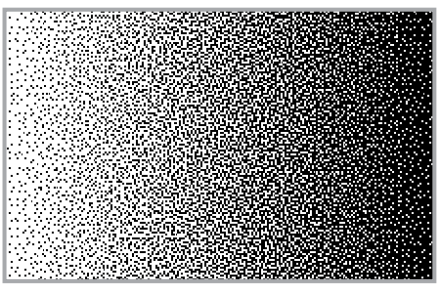


Varying the screening as required for each density range

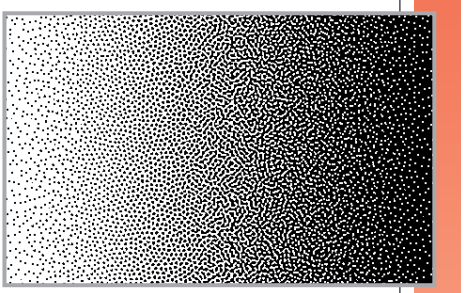
In the 1–10% highlights and the 90–99% shadows, Spekta uses FM screening's fixed dot size and reproduces tone by varying the density of uniform dots. In the 10–90% midtones, it varies the size of the round dots just as AM screening does. The placement of all these dots is random, as in FM Screening, however, which means there are no screen angles to contend with. As a result, Spekta avoids the moiré resulting from factors such as plate misalignment and interference patterns that plague conventional AM screening. Spekta overcomes the difficulty of printing FM screens by setting the size of the smallest dot slightly larger than in FM screens. It also minimizes tone jumping through advanced methods that control the positioning and joining of dots.



AM screening



FM screening



Spekta screening

Highlights and Shadows

Spekta uses FM screening methods in the highlight and shadow areas. The dots are placed randomly, and tone gradation is expressed through variation in dot sizes. The dots are distributed so that they overlap in some areas, and so that there are no large gaps between them. These methods control the graininess that is the bane of FM screening.

Screen has devoted a great deal of time to determining an appropriate minimum dot size. The smallest dot size that can be output at 2,400 dpi is about 10.5 micrometers (1/2400 of an inch). This size of dot can be exposed directly onto a printing plate, but handling of dots this small is inconsistent at press, and there is increased risk of visible printing artifacts in the highlight regions. Spekta creates 2 by 2 grids of 4 dots, using dots of 21 micrometers (corresponding to about 2% of 175 lpi), which is a size that is more appropriate to press capabilities, thereby reducing the risk of print artifacts. This optimizes printing in the highlight regions, while maintaining print stability. Since the dot size used is about 2% of the maximum, by controlling the surface area ratio, changes in tone as small as 0.5% can be expressed, and color output in the highlight areas is extremely smooth.

Midtones

In the midtones, Spekta generally employs random placement of dots, similar to that used in FM screening, but gradations are created using AM-screening like methods. In other words, the same number of dots is used at all times, and dot sizes are varied to create gradations.

Spekta's dot shape is rounded, which yields more predictable results at press. Dot overlap is prevented near the highlight range. What's more, with the latest improved screening patterns, it is possible to control when and where dots join for each contact point. This helps eliminate the effects of dot gain almost entirely between the midtones and the shadows, assuring smooth gradations in this range as well. By preventing tone jumping, Spekta also eliminates the graininess that is liable to occur when different dot sizes are used.

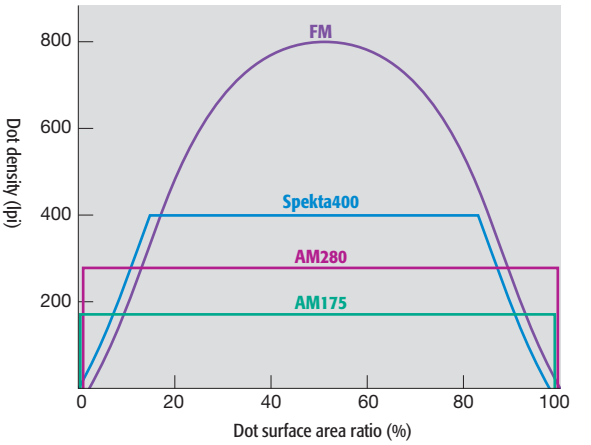
Characteristics of Spekta

Halftone dots for high-precision printing

Spekta produces high-precision output equivalent to 300 lpi output, with much less effort on the part of the printing company. The secret lies in Spekta's unique halftone dot usage. In the highlights and shadows, Spekta uses random dot placement similar to that of FM screening, varying the number and placement of the dots to create remarkably smooth gradations. In the midtones, Spekta uses a uniform number of dots, varying their size to increase the richness of tone, but switching to FM-screening-like methods when approaching the limits of the press's capability to lay down dots (and thereby avoiding the problems that sometimes arise in areas of extreme density).

The graph to the right illustrates the relationship between dot density and dot surface area. As you can see, applying the appropriate kind of Spekta screening for each dot density under the desired printing conditions is easy. Spekta screening offers all the benefits of traditional screening methods without the drawbacks, and makes it easy to achieve high precision, high quality printing.

Relationship between dot surface area ratio and dot density



Preventing moiré

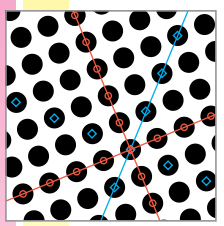


Figure 1: Enlargement, 175 lpi square dots

Figure 3: Enlargement, Spekta screening output

Moiré appears as a result of the interference between repetitive, cyclical screening patterns and patterns within the images being used.* The interference that causes moiré can be eliminated if the problematic repeating patterns within the screening patterns themselves can be controlled.

Here is a simple explanation for why moiré appears during output. Figure 1 is an enlargement of output using square dots at 175 lpi. The repetitive nature of the output is immediately visible. The actual cyclical quality lies in the period at the second dimension, but for explanation purposes, we are using a one-dimensional model in this example. Figure 2-a is a graph illustrating results when there is no repeating pattern. If there is any repeating pattern, however, the repeating pattern of the halftone dots interferes with the repeating pattern in the image and creates an image of a pattern that is not there – otherwise known as moiré.

Spekta was specially developed to prevent this kind of problem. Figure 3 is an enlargement of an image printed using Spekta screening. As you can see, there is no repeating pattern to the distribution of the halftone dots, so even if there is a repeating pattern in the image being output, no interference occurs, and moiré is not generated.

** During scanning of photographs or image capture using a digital camera, moiré may be generated due to interference between the period of the object being input and that of the input device. In these cases, there is no way to avoid moiré in the output since it is intrinsic to the source image, and not to the output process.*

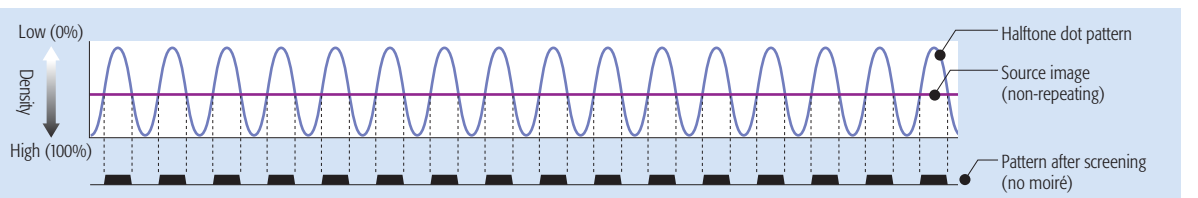


Figure 2-a: Image with no repeating pattern

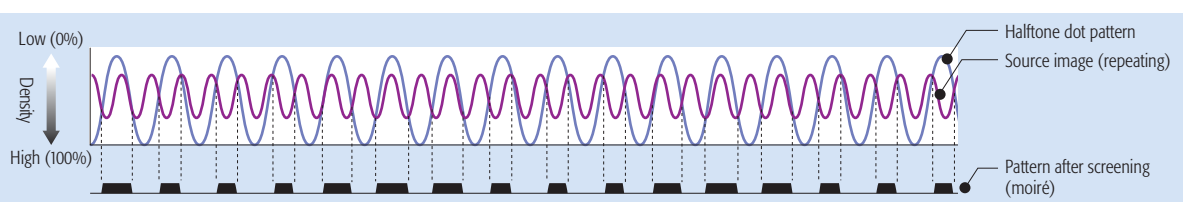


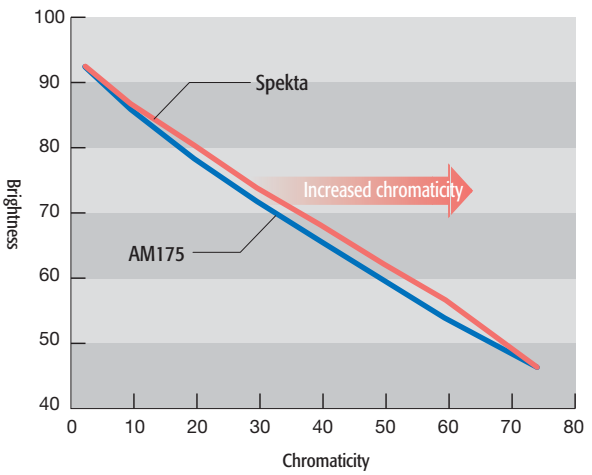
Figure 2-b: Image with repeating pattern

Great color reproduction in the midtones

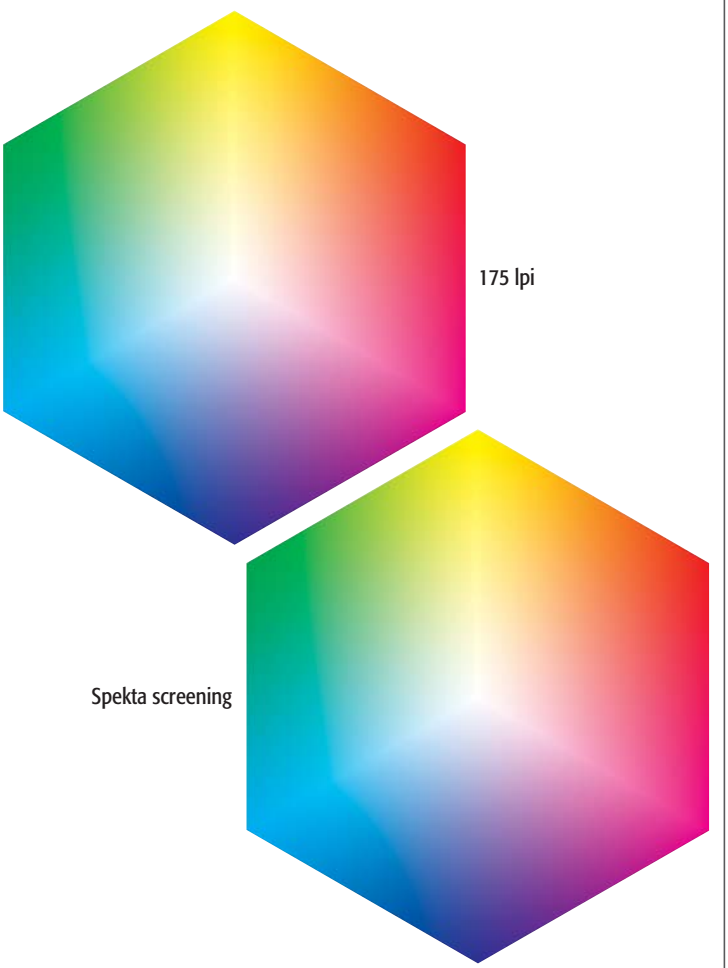
It is commonly observed that as line rulings increase from 100 lpi to 175 lpi or even 280 lpi, the range of colors that can be reproduced increases. It is believed that this happens because as the halftone dots get smaller, their circumference gets larger relative to their surface area, and optical dot gain* around the dots increases, thereby increasing their chromaticity, and increasing the range of colors that can be reproduced. Spekta screening controls the dot shape to maintain increased dot circumferences that enable a larger range of colors, which makes it possible to reproduce more colors than with standard 175 lpi AM screening. There is no difference in the paper or ink density, of course, but the chromaticity of the midtones improves visibly. The hexagonal samples on the right show output using standard 175 lpi AM screening and using Spekta screening. The difference in the midtones is striking.

** Optical dot gain: Increased density around the halftone dot which results from diffusion of light on the printing paper.*

A comparison of 175 dpi and Spekta screening



Color reproduction with 175 lpi and Spekta screening



Better detail and no broken lines

Since Spekta screening creates a pattern of dots that is uniform but not repeating (cyclical), there are no broken lines, such as are often created by interference with the image when using AM screening. As a result, the details of the image are reproduced more clearly, and even fine lines can be reproduced with excellent results.

Less ink required for Spekta screening*

** This effect does not occur in solid areas.*

Spekta screening can reproduce a greater range of midtone colors using a lower halftone dot percentage, thanks to the increase in apparent density that results from optical dot gain. In other words, less ink is required than with standard 175 lpi AM screening.

Sample 1

Preventing moiré

Moiré-free output of a “problematic” striped shirt

Moiré often mars repeated fine patterns and complicated designs when AM screening is used, due to interference between the screening pattern itself and the patterning in the image. Spekta screening is a great way to avoid these sorts of problems. Note the clear, moiré-less reproduction of the striped shirt the woman is wearing.

Spekta Screening

AM Screening

Sample 2

Preventing rosette moiré

Better reproduction of gray and black tones

Note the complete absence of rosette moiré in this sample – from the metallic gears and tools to the denser dark gray and black areas, from the highlights to the shadows, and throughout the midtones. The tone reproduction in the metallic areas is unusually smooth, and the image as a whole feels very realistic.

Spekta Screening

AM Screening

Sample 3

Reproduction of fine detail

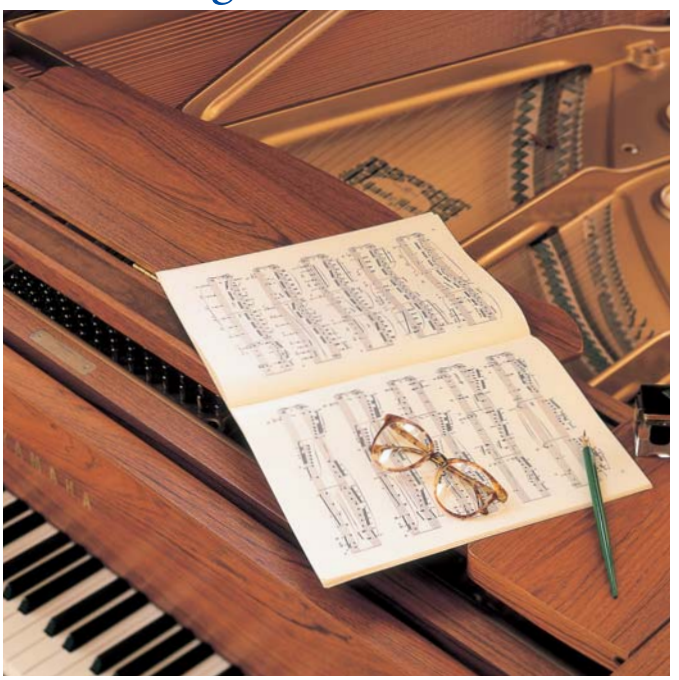
Fine embroidery in the clothing of Japanese dolls
The unique wood grain of a grand piano

The Japanese dolls in this photograph are wearing traditional Kimono made of Nishijin textiles. The fabric appears rich and luxurious, and even the finest details are clearly visible. The beautiful colors of the embroidery shine out, and individual strands of the fine hair are reproduced clearly. The second image features a compelling reproduction of the flowing grain of wood in a grand piano. Spekta screening makes it possible to reproduce these two completely different yet equally beautiful objects in spectacular detail.

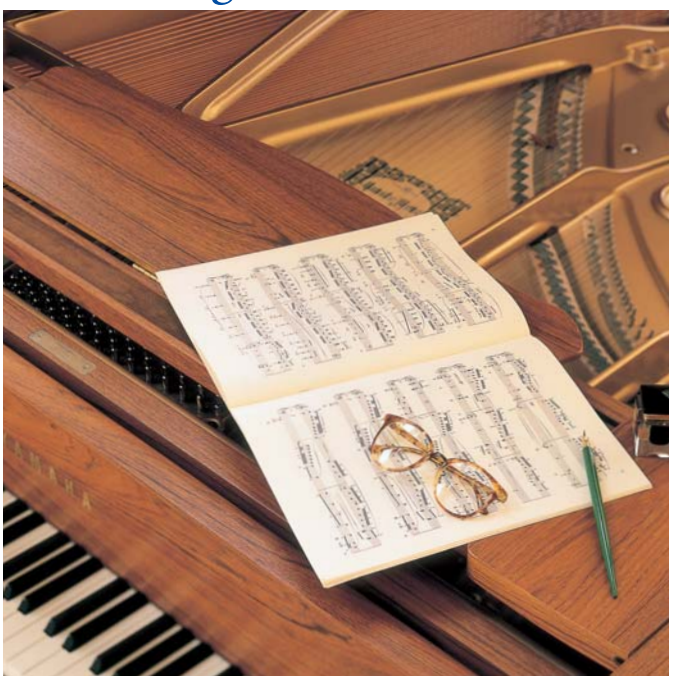
Spekta Screening

AM Screening

Spekta Screening



AM Screening



Sample 4

Eliminating broken lines

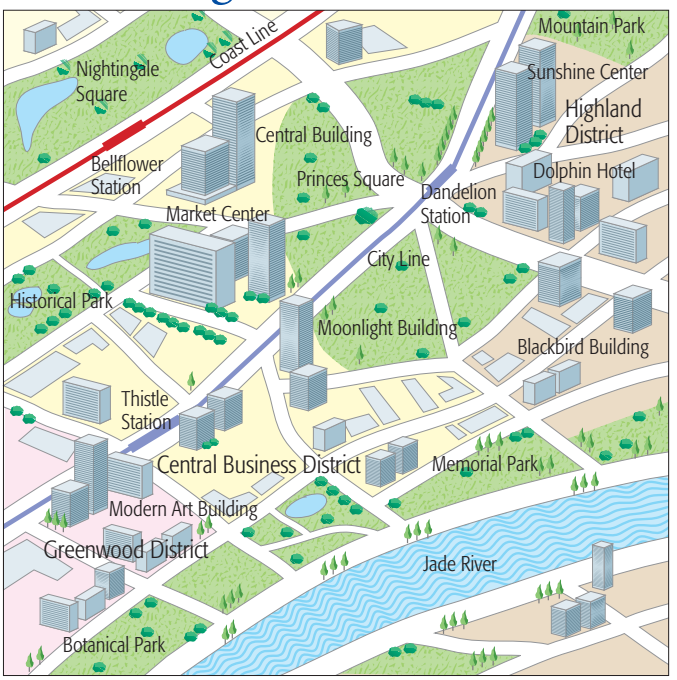
Ropes crisscrossing the mast and sails are reproduced sharply, without broken lines

Note the many ropes criss-crossing the mast of the sailing ship. They are reproduced in sharp detail, without any broken lines. Now take a look at the map. There are lines all over the map – both in the place names and at the edges of the streets. Halftone dots are used in lines throughout both of these images. With AM screening, broken lines tend to appear in areas that feature fine lines such as these, but with Spekta, even the finest lines are reproduced clearly.

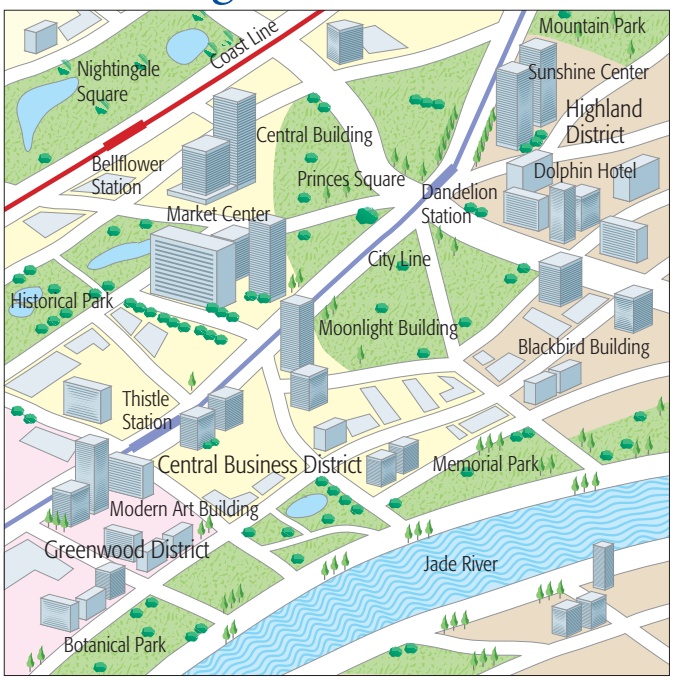
Spekta Screening

AM Screening

Spekta Screening



AM Screening



Sample 5

Superior midtone color reproduction

Spekta screening is perfect for difficult to reproduce midtones, providing a wider range of vivid colors

This sample features cosmetics and accessories that demand particularly vivid color reproduction. The wide range of colors available through Spekta screening make this image particularly clear and vivid. The lace fabric is reproduced in clear detail, and without a hint of moiré. The finely tapered ends of the feather filaments are clear and unbroken, and look as soft as they feel.

Spekta Screening

AM Screening

Sample 6

Black and white images

Reproducing images right down the sacredness of the Buddhas and the power and strength of the steel engine

It is very difficult to express the sense and atmosphere of an image in a printed product when using only black and white. Spekta screening creates the same effects and depth as is sometimes achieved using doubletone black, while maintaining a superior level of detail and tone gradation. The sacredness of the Buddhas is almost palpable in the top image; the strength and power of the train are just as tangible in the bottom image.

Spekta Screening

AM Screening

Spekta Screening

AM Screening

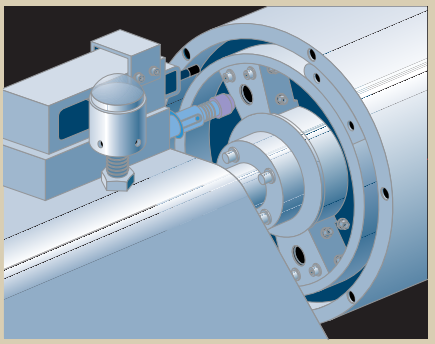
Sample 7

Multi-screening

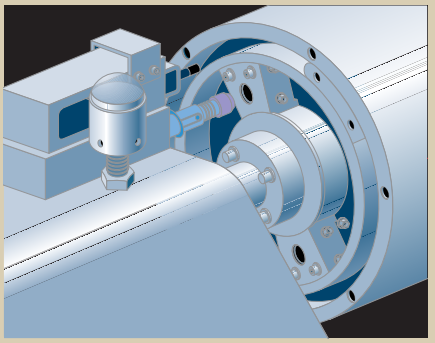
Mixing a variety of screening methods in a single image to take advantage of the strengths of each

These samples illustrate the strength of Spekta screening when different types of screening are used within a single sheet of paper. The gray background is output using AM screening. Spekta screening has been used for those portions of the photos where there is a particular risk of moiré or broken lines, including the shoes, neckties, and technical illustration of the machine. Adobe Photoshop allows operators to process internal Trueflow data and apply different types of screening to different images of a single sheet.

Spekta Screening



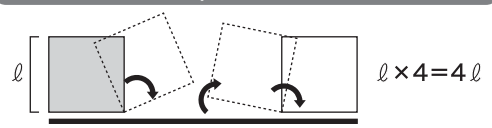
AM Screening



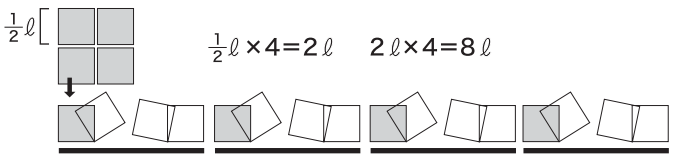
About dot gain

Generally, the amount of dot gain increases as the line screening increases. This is because dot gain occurs mainly around the circumference of the halftone dots. As the line screening increases, and the lines get narrower, the dot circumference increases relative to the surface area of the dot (as shown in the figure below), and the amount of dot gain also increases.

Circumference at 150 lpi



Circumference using the same surface area, but at 300 lpi



Adjusting dot gain

This section will explain how to adjust the dot gain for Spekta, as well as how to achieve better gray balance and tone. For this adjustment, you will need a densitometer that can measure the halftone dot percentage in different areas.

1. Find out what the standard gray balance is at 175 lpi. Create patches of each of the percentages listed below, and print them using your standard densities. If you already know the standard dot gains at 175 lpi, enter them.

   ● Gray tone %

C	3	8	15	27	39	50	60	70	79	87	95
MY	2	5	10	20	30	40	50	60	70	80	90

   ● Solid printed density

   C1.6 M1.5 Y1.3 K1.8

   ** The gray tone and solid density used here are generic standards. Feel free to use your own gray balance and solid printed density standards.*

2. Use Spekta to output the gray tones and solid densities indicated above. Use a linear dot gain.

3. Measure the halftone dots for the gray tones and solid densities in the samples for both standard 175 lpi and Spekta.

   ● Measuring the density

   1) Select the C separation.
   2) Read the paper for the 175 lpi sample, and then read the C patch.
   3) Measure each patch for both the standard 175 lpi and Spekta samples, and note down the halftone dot percentages for each.
   4) Repeat these steps for the M and Y separations, and note down the results.

   ** If the densitometer you are using employs Yule-Nielsen coefficients, enter 1.3 - 1.4 for each of the CMYK readings.*

4. Subtract the Spekta values from the standard 175 lpi values to determine the additional Spekta dot gain.

   Example: 71 - 65 = 6
   (Value for 175 lpi / Value for Spekta / Spekta dot gain)

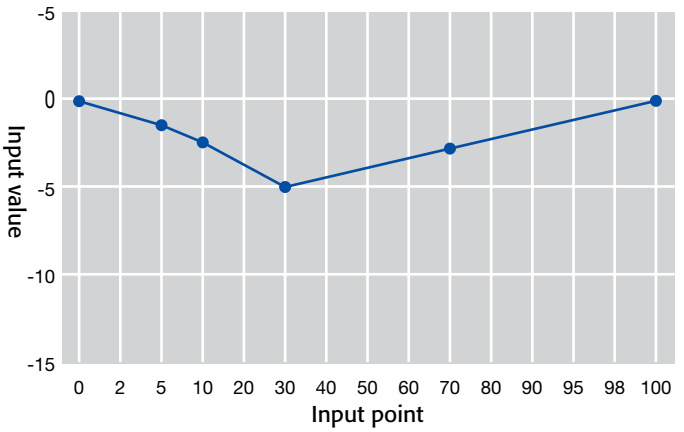
   Repeat this process until you have determined the dot gain for each patch on each separation. Adjust the values slightly so that they create a smooth curve.

5. Enter the values you have calculated into the RIP as dot gain values, and print the patches again. It is not always possible to adjust the gray balance and tone properly on the first try. Repeating the steps described above two or three times will increase precision.

Recommended dot gain levels

In order to achieve the same gray balance with Spekta as with standard 175 lpi output, correct the dot gain as illustrated below.

For Trueflow



	0	2	5	10	20	30	40	50	60	70	80	90	95	98	100
Recommended dot gain values	0		-1.1	-2.5		-5				-2.9					0

** The above input values are for each color.*

** It may be necessary to readjust the gray balance for magenta under certain circumstances.*

** The ideal curve varies depending on the exact printing conditions. Please use the dot gain adjustment procedure described earlier to determine the ideal curve.*

** When the HQ-RIP is used, the input points are different.*

Spekta dot patterns

Since CTP output devices use lasers to "burn" high-precision halftone dots onto printing plates, there should be almost no spread at the plate. Even during output at 175 lpi, with the fine screening provided by Spekta, there should be no need for calibration or adjustment.

Spekta's internal dot gain

As explained above, Spekta doesn't tend to promote spread on the plate, and printing dot gain increases in direct proportion with the line screening. Since Spekta uses a halftone dot pattern that accounts for the predicted level of printing dot gain in advance, there is no need to make major corrections for printing dot gain.

FUKUIN CO., LTD.

A new level of quality made possible through a dynamic new concept

Shunichi Fujiwara, Vice-president in charge of Planning
Takashi Masuta, Technical Producer

Fukuin Co., Ltd. started looking at Spekta screening quite a while ago, but we only began using it in May, 2001, when we produced a product catalog featuring high-end monitors and a doubletone photo collection. For the product catalog, we were hoping to avoid moiré and increase chromaticity. For the photo collection, our goal was to reproduce the density range and shadow detail of the silver halide prints. These two jobs are representative of many subsequent projects, and are particularly good examples of the excellent results that can be attained with Spekta Screening.

There are many benefits to Spekta screening, but I believe the most important is that we no longer have to worry about screening angles. There is also the benefit in CTP management of not having to worry about dot angles when reprinting a single plate or performing color management.

The advantages of using Spekta screening are numerous. In the aforementioned collection of doubletone photographs, Spekta provided a remarkably smooth set of gradations, without any sharp changes of tone, resulting in an even wider range of printing densities. This was the first time we had ever seen details in the shadow areas reproduced with such great accuracy, while the overall density was also maintained.

The reproduction of the monochrome photographs was also remarkable. More than 50% of the images included areas where the dots were not connected, so even when dot gain did occur, the apparent density did not change very much,. This made it possible for us to increase the density in the solid areas, giving the printed product a feeling of depth and weight. Spekta's extremely fine dots helped prevent colors from mixing, and density remained consistent even in the midtones and below. The highlight areas were also smooth and free of sharp jumps in tone, so that the gradations were extremely similar to those of the original doubletone photographs.

The range of colors that can be achieved with Spekta screening is also remarkable. For images with a high chromaticity, we got the kind of vivid color we'd expect with our usual ink settings and FM screening, but there was no drop in density in the solid areas. In general, we felt the improvement in color reproduction was the most remarkable quality of Spekta screening. Naturally moiré was reduced dramatically. What's more, we discovered through a variety of tests that Spekta screening could be used not only with coated paper, but with all our other types of printing stock as well.

There are a few notes of caution, however. In order to assure that the rich and smooth tone gradations and three-dimensional feel that are typical of Spekta are maximized, it is important to pay more attention to sharpness during input than is usual. Also, during color separation, we had trouble with the red tones; it is important to adjust dot gain settings precisely.

At press, precise ink density and dot gain control are crucial. AM screening dots vary about 10% to 15%, but Spekta screening dots can vary from 15% to 20%. As a result of the emulsification of ink that is typical of high-quality printing, when the amount of dampening water is high, the ability of dots to be laid down on the paper properly is reduced. It is of course important to adjust the amount of dampening water properly, but it is also possible to maintain the width of the dots by using more hydrophilic paper stock. When the water is squeezed out, the printed product dries faster, and there is less risk of paper stretching and other variables coming into play, so that the final product is generally better. Furthermore, by changing the amount of soy contained in the ink, it is possible to increase the benefits provided by Spekta screening.

There are a few other things I'd like to mention. We are still looking into how to optimize inks to reduce a tendency towards excessive ink coverage. We are also looking into how exactly to manage proofing; at the moment we expect that proofing using traditional proofing presses will most likely be the solution.

To make the most of Spekta screening, with its wide variety of benefits, it is necessary to pay attention to certain details. Screening is the foundation of offset printing, and changing such a basic factor results in other dynamic changes in the concepts we are accustomed to working with.

We continue to enjoy the great benefits of Spekta screening, and with this new tool, we look forward to exploring many new concepts.

SHASHIN KAGAKU CO., LTD.

Striving to provide added value. Contributing to the improvement of our existing production line.

Takashi Matsumura, Head of Manufacturing
Kenji Ono, Platemaking group leader
Yoshikazu Nishimura, Printing group leader

Since about 15 years ago, **Shashin Kagaku Co., Ltd.** has been looking into different methods for high-end printing, and trying new methods every few years. Unfortunately, many of the methods we tried featured problems that prevented them from fitting into our printing environment, so that we were unable to make them a mainstay. When we first heard about Spekta screening, a method for making high-quality printing easier, we couldn't quite get rid of our preconception of high-end printing as being difficult.

To determine whether or not we could incorporate Spekta screening into our production line, we ran a few tests focusing on the actual printing process. In these tests, we discovered several things. We learned that precision was quite high although the amount of ink required was less than with methods we had tried in the past. We found that there was a tendency towards emulsification and overinking if the ink balance and supply were off. We also discovered that any slight error in registration had a great effect on the printed product, and that the color balance was easily changed.

To prevent the problems with overinking and emulsification, we reduced the amount of dampening water as far as possible. To reduce those amounts, we analyzed the amount of dampening water required in each area, and used adaptable H fluid. To increase registration accuracy, we improved the separation of the paper from the blanket. As mentioned earlier, we had reduced the amount of dampening water, and this reduced paper stretching, all of which resulted in increased registration accuracy. We also carried out tests on the ink, and made adjustments so that there was almost no ink tacking up during the ink set period. We finally chose ink that both absorbed and transferred well.

Through these various corrections, we were able to eliminate our initial impression that high-end printing would be as difficult as with other methods we had tried. The moiré and broken lines that plagued us in the past were eliminated, and we were impressed by the vivid color we attained. All of this left us with the impression that high-end printing was now within reach.

The benefits of Spekta cannot be attained simply by using the product as it comes from the manufacturer; the user has to do some of the work as well. We tested Spekta screening in a variety of different ways, and with our optimized methods, we achieved results that outstripped those achieved with 175 lpi printing in the past. As the manufacturer likes to say in selling the merits of Spekta screening, there was no need for us to create a special production line for this new screening. If we had needed to create a special workflow just to achieve higher detail, we would have experienced a dramatic loss of productivity. That was the biggest reason that we were adamant about using the same 175 lpi production line as in the past. Similarly, in the platemaking stages, we only need to monitor and adjust the output curves. We are now quite close to standardizing the settings for use with Spekta screening.

There are still a few problems we need to solve before changing over to Spekta screening for all our work. Our use of materials, including plates, inks, and H fluid, continues to advance, however, and by bringing all these factors into line, we are confident that we can run our production lines smoothly with Spekta screening. We look forward to opening our new, added-value Spekta production line in the very near future.

ART SCANNER SERVICE CO., LTD.

A steady effort towards optimization leads us to take advantage of Spekta's mixed screening capabilities

Kenichi Kamijo, Vice-president in charge of Graphic Arts

Art Scanner Service Co., Ltd. started using Spekta right around the time when it was first released. The purpose of adding Spekta screening was to support our efforts to create products with added value. Since purchasing a printing press last summer, we have conducted tests and increased our know-how, and we are currently pursuing a number of possibilities. With the guidance of Dainippon Screen, we have been able to eliminate moiré, rosette moiré, broken lines and jaggies, as well as abrupt changes in tone in gradations. The reproduction of details and color are much improved, and the problems we had with AM screening have been greatly reduced.

One outstanding characteristic of Spekta, which made all this possible, is that there is no need to worry about screening angles. Another equally important point is that we have been able to adapt our existing RIP and CTP production line to expose plates for 2400 dpi/175 lpi printing. In order to achieve highly-detailed printing without losing productivity, however, we have had to be much more detail oriented than in the past, making adjustments to the printing environment and keeping to a strict daily maintenance schedule. Without our steady efforts in this regard, we would be unable to get the most out of Spekta's mixed screening capabilities.

We began by looking into creating a printing environment that would get the most out of the plates we created in our CTP line. First we had to get the right environment for the printing press. We engineered the room so that we could control the temperature and humidity 24 hours a day, 365 days a year, and used a powerful air cleaner to remove dust and dirt from the room.

Next, we tuned the printing press itself very carefully. For example, we learned that to get consistent printing results with Spekta, it is important to keep the amount of dampening water lower than usual. What's more, whatever dampening water is squeezed out of the paper must be monitored lest it become dirty. For this reason, we decided to use ultrapure water output through a reverse osmosis membrane as dampening water, and to change the water periodically in order to keep it consistent in quality. In addition, we periodically adjusted the roller nips, and replaced the rollers themselves. We did all this in our effort to create a more consistently high-quality printed product.

We quickly learned that, although the ratio varies depending on the image, Spekta tends to require less ink than AM screening, and certain adjustments need to be made to compensate for that tendency. In order to keep the thickness of the ink layer consistent, ink control has to be very precise, and printing must be monitored carefully, with adjustments made for dot gain and other factors such as roller temperature. Printing stock should also be stored in the printing environment for a day to adjust.

We also paid a great deal of attention to data control in the platemaking stages, and with the aid of repeated tuning of our equipment, have reached the point where CIP3 data makes it possible for us to produce about 90% of our printed products without making any adjustments to the printing press. By eliminating each of the individual factors that cause variation in the printing press, we have made it possible to handle the printing press as if it were merely another imagesetter or printer. At this point, we usually get an OK sheet within about 20 sheets.

It has taken some time, trouble, and effort to get to this point, but now that the environment and standards are set up, the daily workload is light, and getting up and running each day is very fast. There is no question that, in addition to creating high quality printed products, Spekta is a revolutionary, easy-to-use, next-generation screening method. I can safely say that our firm belief in Spekta prevents any regrets for the effort we had to put forth.

In today's word of advanced digitalization and CTP, it is important for each of us to try new ideas. And to meet our customers demands, we will do our best in the future to maintain a consistently professional attitude and deliver the best solution possible, no matter what the task.

UFO CO., LTD.

An attractive option for increasing the quality of Hi-Fi printing.

Mitsuharu Masuko, Vice-president

UFO Co., Ltd., using its technical knowledge as a service bureau and in order to meet the needs of high-quality printing, has begun doing 6-color Hi-Fi (hexachrome) printing. We chose the new Spekta screening as an option for solving some of the difficulties inherent in Hi-Fi printing.

UFO Co., Ltd. always strives to set itself apart from the competition, as evidenced by our use of Hi-Fi printing. For this reason, we have already tried a variety of new techniques and workflow structures. CTP and printing presses continue to advance, and the more advanced they become, the harder it is to achieve quality and productivity that stand out from the crowd. So what can a company do to set itself apart? We believe the answer lies not only in acquiring better equipment and systems, but also in creating an environment in which the full potential of that equipment can be realized, and its merits displayed fully.

Spekta is no exception to this rule. Using numerical controls, a type of control that we have been using for some time in monitoring output levels in our work as a service bureau, we strive to keep levels of operation at our printing presses consistent. This has meant placing the actual printing presses in an optimal environment and creating a workflow in which measured numerical ink levels, printing pressure, and dot gain all lie within acceptable limits. Generating a variety of numerical standards for ink levels in different types of jobs has also made it possible for anyone to operate the equipment easily, so that our printing press is really more like a slightly complicated color printer. As a result, even operators with very little printing experience can create product with acceptable quality. With this simplified operation, it's simplified to meet the needs of high-quality printing, and we trust that our achievement of this goal has helped to set us apart.

Spekta has shown its strength by enabling us to output extremely fine detail even with Hi-Fi printing. Since there are no screening angles, registration accuracy is excellent even when six plates overlap. What's more, the color range in the midtones is extensive, the colors are vivid, and the images produced are highly realistic.

Spekta has a wide variety of advantages, as you can see, but some of our operators have mentioned that printing with Spekta can be difficult at times. I believe that they are taking our efficient printing environment for granted, however, and that no matter how good the environment, they might make such statements. Our environment is not yet perfect, of course; I suspect that by improving those areas that can be improved, we will be able to enjoy more of the advantages of Spekta.

Having said all this, I should point out that we do not use Spekta for everything. Depending on the purpose and use of the final product, we select the best option from among a variety of screening types, including the AM and FM screening used most often in the past. Sometimes the customer makes the decision for us. I also feel that we should be looking into other options for improving color reproduction beyond screening alone. Hi-Fi printing, which does not limit itself to four colors, is one such option. We have also entered an era in which more and more people view colors on the displays of personal computers, and I think it might be acceptable for the colors of printed products to approximate RGB color at times.

Customer needs changed when the world entered the information age. We must therefore question many of the things we used to take for granted. For UFO Co., Ltd., the goal is to try new things, keep on top of our numerical controls, and increase our unique set of skills. Spekta will both increase our ability to create better printed products and provide us with the added value we have been looking for.

Checklist for getting the most out of Spekta

In order to maintain the highest level of quality possible with Spekta, we recommend following the five guidelines listed below. Feel free to use this as a sort of checklist.

1 Are you keeping the room containing your printing presses at a consistent temperature and level of humidity?

Are doors opening and shutting when materials are brought in? Is outside air blowing in? Is there dust in the air?

2 Are you maintaining your printing press properly?

Are you replacing the rollers and adjusting the roller nips? These are extremely important factors in keeping printing conditions consistent.

3 Are you storing printing stock in the room with the presses for at least a day?

Storing paper in the room with the printing presses allows it to adjust to the environment, thereby reducing the chances of paper stretching.

4 Have you adjusted the dampening water levels as low as possible to prevent emulsification of the ink?

The presence of too much dampening water promotes emulsification of the ink, which tends to prevent dots from being laid down properly.

For this reason, it is best to keep the dampening water levels slightly low.

5 Do you have a good grasp of standard dot gain at 175 lpi?

It is very important to monitor the quality of the printed product using objective numerical standards, rather than just by eye.
Spekta can create much richer color in the midtones, but it also requires dot gain adjustment in that range.
For information on adjusting dot gain, see page 12 of this guide.

This guide was printed using the following:

Printing press: Heidelberg Speedmaster 102F

Paper: Nippon Paper Industries RECYCLED COAT 100

Ink: Osaka Printing Ink Opis 100N

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• This brochure was made using SPEKTA screening.
• Printed on recycled paper.

No.222-169E Printed in Japan 09-03 10FSM(R0-0)