COLOR MANAGEMENT IN PRACTICE

ECO³ SPIR@L in Newspapers

Arkitex Enhance Sample Description

Contents

Thanks to:
Joost Swenne, technical director at Janssen Pers, all technical staff involved in the planning and prepress departments, and the press operators for producing the printed samples.

Introduction

Setting a new quality standard in Coldset printing

SPIR@L is Agfa's latest patented screening technology, based on the fundaments of Sublima screening.
It holds a 1-99% range of dots in print, while It requires no expensive upgrades for your CTP or printing press.
The concept is both straightforward and innovative at the same time: it replaces the traditional dots with more efficient shapes such as spirals.
Thanks to the solution's smooth transition from positive to negative spirals and minimum white gap, the result is always smooth while bringing out all detail in vibrant colors.
SPIR@L reduces the ink layer of the each dot which has a positive impact on printing speed, time to OK-pint, overall quality and post-print handling.

ECO³ SPIR@L Newspaper Software Samples

This is a description of the ECO³ SPIR@L Newspaper Software Samples set, produced to show the new SPIR@L screening technology in combination with the Arkitex Enhance products for newsprint production.
OptiInk Ink optimization, OptiColor color transformations and IntelliTune for automatic image enhancement, all based on automated PDF processing as part of the Arkitex workflow.

Leo Groen, Agfa N.V. Belgium

ECO³ Newspaper Printing Samples

The ECO³ Software Newspaper Sample set consist of 16 pages, printed single sided. The sets are available on **Standard Newsprint (SNP)**, **Improved Newsprint (INP)** and **Uncoated White** papertypes.

Agfa Lupes

There is an **Editorial Image page**, and an **Advertisement page** that are shown in different combinations of ECO³ enhancement software and screening technology applied. To quickly see which screening technology and lineatures are applied, refer to the **Agfa Lupe** on each page. Screenings applied: **ABS 100 lpi**, **Sublima150 lpi**, **SPIR@L 100 lpi** and **SPIR@L 150 lpi**:

Editorial Images pages

Page 10
This is the original page separated to ISO 12647-3:2013. The images are converted with the WAN-IFRA profile to colorimetric RGB to CMYK separations. Other content is created in WAN-IFRA CMYK newspaper space directly.

Page 7
This is the original page with Ink optimization applied. It will bring down the total ink limit within the newspaper standard, saving **19.1%** ink. Screening applied is Sublima 150 lpi with an elliptical dot.

Page 12
The same page as Page 7, now with **automatic image enhancement** applied by

IntelliTune. Since images will be more open to bring out detail, an additional **6.8%** ink is saved on this page. Screening applied is **SPIR@L 100 lpi**, saving **11.9 %** ink. Compared to page 10 the total ink usage is reduced by **37.8 %**, while quality and printability are improved.

Page 5
The same page as Page 16, now with **SPIR@L 150 lpi** screening applied. Compared to page 10 the total ink usage is reduced by **50.5 %**, while bringing out even more detail and smoothnes

Advertisement pages

The base adverts are separated for commercial offset on coated paper, not for newsprint. This is a common issue that causes problems with the amount of ink that exceeds the limits of newsprint. If only ink optimization is applied, set-off and see-through issues will be limited. However, this results will look dull and colors will show typical problems: Blue becomes purple, Red turns to orange. Skintones are dull and too dark.

Page 14
This is the base commercial adverts page with only Ink optimization applied. It will bring down the total ink limit within the newspaper standard, saving **22.4%** ink. However, colors are still in the commercial color space looking dull and dark in newsprint. Screening applied is **ABS 100 lpi**, with a round dot.

Page 3
The same adverts page as page 14 with on top, an automatic Commercial to newspaper color transformation by OptiColor. As such, the original intended commercial colors are reproduced as close as possible in the newspaper color space. Colors will look brighter and saturated, and all lost shadow detail is again visible. At the same time, an additional **19.8%** ink is saved. Screening applied is **Sublima 150 lpi** with an elliptical dot.

Page 16
The same adverts page as Page 3, now with **SPIR@L 100 lpi** screening applied. An additional **7.5 %** ink is saved. Compared to page 14 the total ink usage is reduced by **49.7 %**, while quality and printability are much improved.

Page 1
The same adverts page as Page 16, now with **SPIR@L 150 lpi** screening applied. Compared to page 14 the total ink usage is reduced by **50.5 %**, while bringing out even more detail and smoothness.

Newspaper Software Introduction

Introducing SPIR@L screening in ECO³

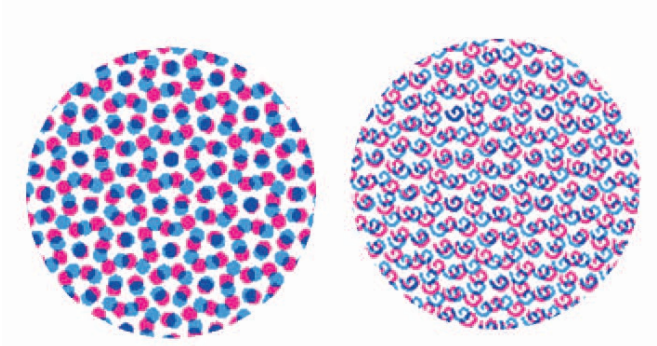
SPIR@L is perfectly in line with our ECO³ program for sustainable innovation, saving you ink during the printing process. In designing and creating solutions based on hardware, software and consumables, we focus on achieving three success factors: **ecology**, **economy**, and **extra convenience** (ECO³). The aim is to make your prepress and printing operations cleaner, more cost-effective and easier to manage and maintain. Our ultimate goal? To generate more value for your entire business.

Secrets of SPIR@L screening in a nutshell

Based on the fundaments of our well known Sublima screening, SPIR@L is Agfa's latest patented screening technology. With a guaranteed minimal dot reproduction, we can print the entire range from 1-99% while maintaining a mathematically proven **moiré free structure**.

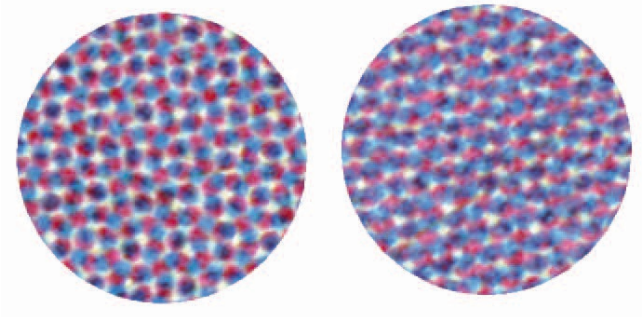
SPIR@L uses the same lpi and dpi as a conventional AM screen and draws a *curve* and *groove* to create the SPIR@L 'dots'.

Left: **digital** AM screen, *right:* **digital** SPIR@L screen



However, the curve and groove applied will almost disappear in print providing a similar cleanness and rosette structure as AM.

Left: **printed** AM screen, *right:* **printed** SPIR@L screen



SPIR@L in Practice

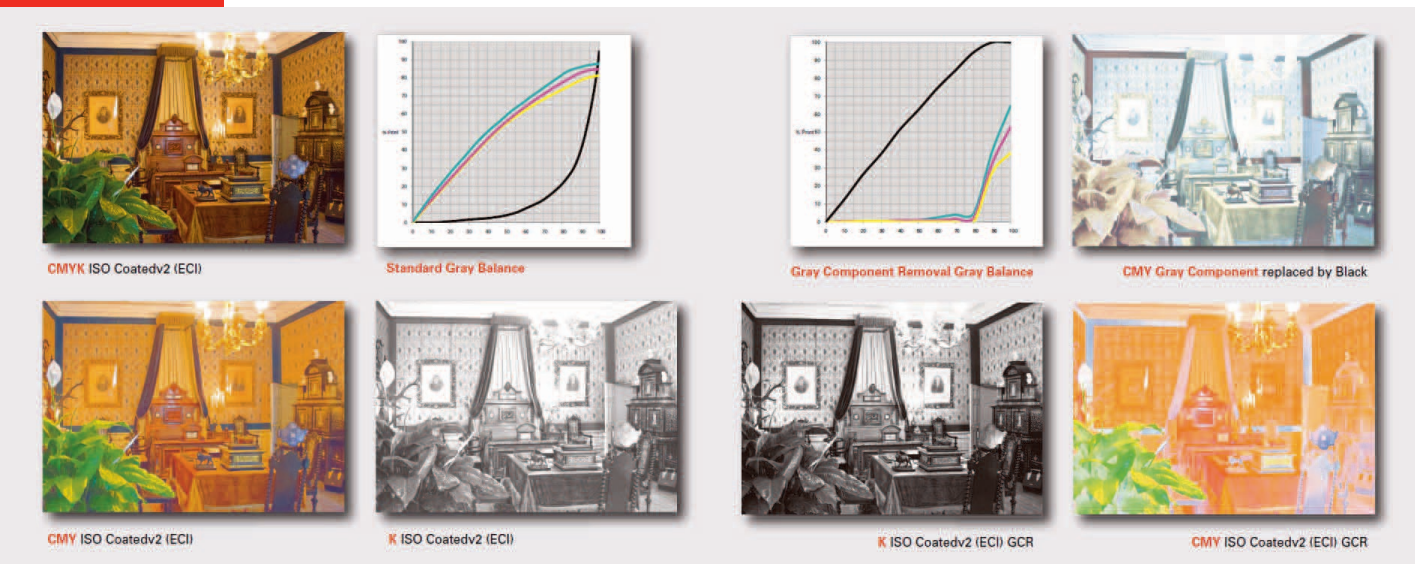
With a normal lupe you may see the same structure and dot as a conventional AM screen in print, with the huge benefits of having a lower ink layer in the dots itself. This will improve printability and reduce ink-usage resulting in a sharper image. On top, a calibrated SPIR@L screen will reproduce the **same colors** in print without extra efforts!

Introducing Arkitex Enhance

Arkitex Enhance OptiInk

Overview
Arkitex Enhance OptiInk offers you great gains in productivity and great savings on ink costs.

InkSave: GCR
The substitution process of the gray component of a color by black, is known as **Gray Component Replacement (GCR)**.
Contrary to *Under Color Removal (UCR)* where only the (near) neutrals in the shadow areas are replaced by black, GCR can be applied over the entire tonal range and in all colors. Black will be used as the equivalent result to what would be printed as product of the neutral or achromatic component of C, M and Y. OptiInk applies an automatic re-separation to the target press, optimizing the separation without changing color space or visual appearance. This results in more accurate and consistent adherence to print standards. This results in a more economical use of ink, higher color fidelity, and also improves time to print reducing paper waste - saving you a lot of unnecessary expenses.



InkSave: DLC
On top of GCR, Arkitex Enhance OptiInk uses Dynamic Low-Ink Coverage (DLC) technology in conjunction with Agfa's patented Advanced Color Management, to provide the maximum possible saving on ink costs, while maintaining the highest level of quality. This is extremely useful when printing on more difficult paper types as Improved Newsprint and semi-commercial papers that have a reduced capability to receive ink.

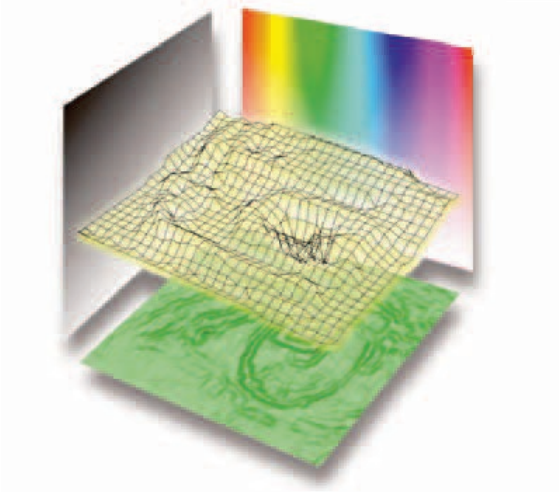
Arkitex Enhance OptiColor

Overview
Arkitex Enhance OptiColor offers you great gains in color quality, while it is completely automatic. In addition to OptiInk re-separation, where separations are optimized for a specific target device, OptiColor will automatically convert color on-the-fly using automatic **Smart Input Space Recognition (SISR)**. Based on the color contents or 'fingerprint' of the images, this intelligent module calculates which profile was used to separate the images in a file, assigns this profile as input sapce and then automatically converts to target space. If an advertisement is created for commercial print, and supplied as-is for newspaper printing it may look darker and dull or muddy. Re-separation or ink-save does not improve the visual appearance for the new target device. OptiColor will get the original *intended colors* as close as possible reproduced in the target color space. Even if the source space is wrongly tagged or unknown. Since the higher tonal value increase of Coldset is taken into account, separations will be lighter, resulting in less ink on paper, further improving printability and vivid color results.

Arkitex Enhance IntelliTune

Overview
What if you could print your newspapers as fast as you do now, but with even better print quality for your pictures?

Intelligent and automatic image enhancement
The Arkitex Enhance IntelliTune software tool makes your pictures even more eye-catching by automatically applying corrections for each of your channels. Web, print and/or mobile? IntelliTune analyzes the tone, color and spatial characteristics of your images. It improves contrast and removes noise. It sharpens details, makes skin tones more realistic and improves general clarity. Not by applying a one-size-fits-all technique, but by analyzing each and every image in your pages – quickly and easily.
Do you want a stunning front page every day? Then Arkitex Enhance IntelliTune is what you are looking for.



Printing Samples in Detail

Advertisement samples
If you take the printed samples, you will see the advertisement samples on page 1 and 16 printed in vivid SPIR@L colors. However, this is a result of a different tools that are applied automatically in the Arkitex workflow. Let's have a look in more detail of the different stages.

Page 14 Shadow Detail
This is the same content however with dull colors and dark skintones. Shadow detail is not visible. If this looks familiar, this is why:
The original adverts are separated for commercial offset on coated paper. As such, most shadow detail is separated in the range of 240% to 330% ink coverage. This is far outside the printable range of Coldset. With inksave applied, K is used to replace the more expensive neutral CMY colors. However, color appearance is not changed and inks are only limited to perfect printable values in Coldset. This makes most detail is lost in print:

Original Commercial separation

Inksaved result in print

Page 1, 3, and 16 Shadow Detail
On page 1, 3, and 16 OptiColor is added to the inksave process, transforming automatically from source to target space. This keeps all detail possible in the dynamic range of Coldset:

Original Commercial separation

OptiColor result in print


Original Commercial separation


Inksaved result in print


OptiColor result in print

Page 14 Blue becomes Purple issue
If color is separated for commercial, and printed in Coldset, you may see the typical 'Blue becomes Purple' issue in print as shown in the inksaved result on page 14. If OptiColor (page1, 3 and 16) is added in the workflow, this problem will not show since the *intended* colors are printed.

Original Commercial separation

Inksaved result in print

OptiColor result in print

Page 14 Dark and Dull Skintones
If color is separated for commercial, and printed in Coldset, Skintones become dull and dirty in print as shown in the inksaved result on Page 14. If OptiColor (page1, 3 and16) is added in the workflow, this problem will not show since the i*ntended* colors are printed. Depending on the screening used, OptiColor can automatically apply **Unsharp Masking (USM)** to bring out the original *intended detail* on newsprinting paper.

Original Commercial separation

Inksaved result in print

OptiColor result in print

Page 14 Dull colors without crispy detail
If color is separated for commercial, and printed in Coldset, color becomes dull and detail is lost in print as shown in the inksaved result on Page 14. Depending on the screening used, OptiColor can automatically apply **Unsharp Masking (USM)** to bring out the original *intended detail* on newsprint paper.

Original Commercial separation | Inksaved result in print | OptiColor result in print

Influence of screening technology on detail
Note how SPIR@L 100 lpi on page 16 brings out much more detail compared to ABS 100 on page 14. SPIR@L 150 on page 1 shows even more detail, both due to increased LPI and USM.

Editorial samples
If you take the printed editorial samples, you will see the images on page 5 and 12 printed in vivid SPIR@L colors. However, this is a result of a different tools that are applied automatically in the Arkitex workflow. Let's have a look in more detail of the different stages, starting with page 7 and 10.

Page 10 standard separation
This is the same image content however colorimetrically converted from RGB to CMYK using the IFRA ICC profile. This could be a result of no manual image enhancements are applied.

Page 7 Inksavings applied
Here you see the same content if ink optimization is applied. There are no real color differences, however we also changed from ABS 100 lpi to Sublima 150 lpi. Note that we already save **26.2%** ink on here.

Ink Optimization and printability
To show ink optimization is also improving printability, look at the back of the page 10.

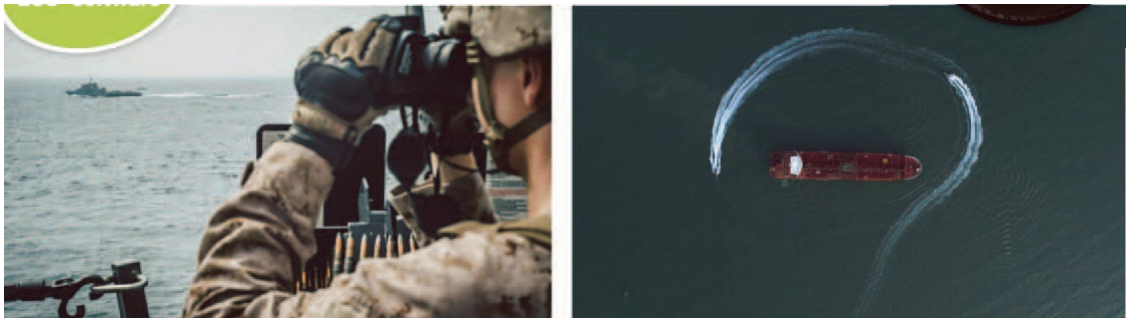
Depending on which sample you are judging: Standard Newsprint or Improved Newsprint, you will not both see-through at the back of page 10 from the cell phone and set-off from page 10 at the back of 12.
This clearly improved with ink optimization on page 7. Less see-through at the back of page 7 and no set-off from page 7 at the back of 5.

Back Page 10 see-through

Back Page 7 see-through

Back Page 12 set-off

Automatic Image Enhancement
The images on page 5 and page 12 are enhanced and converted from RGB to CMYK by IntelliTune. This is also a complete automated task. On top, improving detail and color has also a positive impact on ink usage at the same time. In most cases, an image will be made brighter for newsprint to open underexposed areas in print. Sharpness is applied to bring out detail in function of the screening technology used.



Standard conversion using WAN-IFRA newspaper 26v5 without enhancement

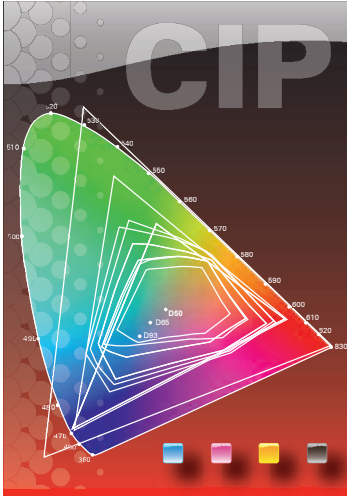
IntelliTune image enhancement using WAN-IFRA newspaper 26v5

Screening technology and flat tints
Note the white text over the colored cyan and orange spirals in the cell phone on page 10 (ABS 100 lpi) in comparison with Page 12 (SPIR@L 100 lpi) Although both have the same resolution and lines per inch, SPIR@L is smoother and text is better readable thanks to the spiral screen. SPIR@L 150 lpi on page 5 is again improving in smoothness and detail over SPIR@L 100 lpi.

Production details

Production details ECO3 SPIR@L Newspaper Software Samples

Samples:	Color Management in Practice CIP-20190926
Workflow:	Arkitex Production V12 calibrated to ISO 12647-3:2013 Arkitex Enhance: Image Enhancement: IntelliTune 5.6 Ink Optimization: OptiInk 5.6 Color Transformations: OptiColor 5.6
CMYK profile:	WAN-IFRAnewspaper26v5.icc
Screening technology:	Agfa SPIR@L round 100lpi @ 1270 dpi Agfa SPIR@L round 150lpi @ 1270 dpi Agfa Sublima Elliptical XM 150lpi @ 1270 dpi Agfa ABS Round 100lpi @ 1270 dpi
Plates:	AgfaN95-VCF
Platesetter:	Agfa Polaris XTV-S
Press:	Manroland Geoman to ISO 12647-3:2013
Paper types:	Standard Newsprint 45 gr/m^2 Improved Newsprint 56 gr/m^2 Uncoated White 70 gr/m^2
Printer:	Janssen/Pers Rotatiedruk, Gennep the Netherlands.



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CIP151E-20191005

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