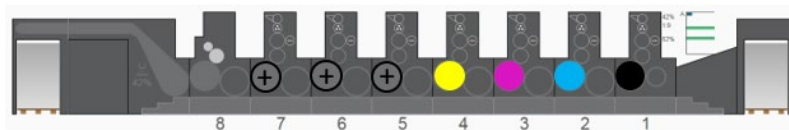


- Web Special | Printing with an extended fixed ink set -

What's it all about and how can I make full use of the great possibilities and benefits?

The approach of multicolor or expanded gamut printing in general is, that one, two or more extra inks are added to the standard ink palette with its process colors Cyan (C), Magenta (M), Yellow (Y) and K (Key/Black).



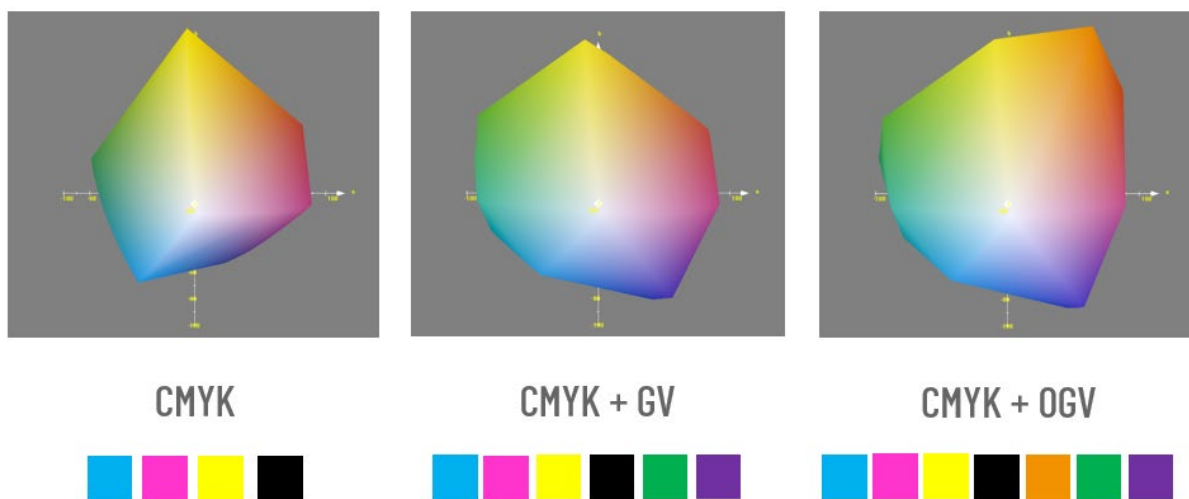
Several names, same meaning

Expanded/extended gamut printing
Multicolor printing
Hi-fi printing
N-color printing
Fixed palette printing

Currently, the most commonly used inks are orange, green and violet.

The reason is, these colors help to extend the gamut of many printing devices to the most optimal size and this particular color space expansion easily covers the majority of industry printing targets required. Ultimately, it depends on the aim, the print jobs and the colors they contain to decide which additional inks are best suited.

The following graphic visualizes the basic idea of expanding a “standard gamut”. In this example orange (O), green (G) and violet (V) are added to our commonly used process colors CMYK (which are also known as “warm color set” and OGV as “cold color set”). But, as mentioned before, the “X” can be set up in different ways. A [color management expert](#) will provide guidance on how to best configure a preferred ink set for your needs.



What is the main goal of doing this?

The goal is to achieve, that any spot colors, like Pantone colors, can be reproduced with a fixed ink set using a set of process colors instead of unique spot color inks. This is often not possible with just CMYK if you want to achieve the required reproduction quality. And as you already know, the accuracy

of spot and brand colors is of the utmost importance to a brand owner. The color always needs to be precise and consistent – all over the world on any kind of product or promotional piece.

So, the main goal is to achieve a perfect result by expanding the fixed ink set (CMYK+X) with additional colors (as explained above) and reproduce all spot colors with these – instead of using special colors

in your printing press when you have to print a job that contains spot colors.



For example, in packaging there are mostly special (brand) colors utilized, they help brands to attract attention, maintain brand awareness and also contribute to product counterfeit protection.

What are the advantages of this printing method?

There are a lot of great reasons, why it is very beneficial to implement an extended fixed ink set! Let's review them...

1. You are able to reproduce close to 100 % of spot colors with CMYK+X. For example, on a Hp Indigo 7900 with CMYKOGV 94 % of the PANTONE + Solid Coated Library were reproduced with a Delta E of less than 2 – using the right software.
2. You as a printer (as well as your customer) save time and money by doing this: You do not need to order/pay for special inks, wait until they are mixed and delivered. This reduces ink costs tremendously (→ see an example below) and your entire production process will be much faster and it lowers cost.
3. Due to this – you as a printer have a huge competitive advantage as you can offer reduced pricing and faster delivery times.
4. Special spot color inks no longer need to be stored – think about the space and warehouse costs – and the reduction of disposed useless spot color inks.
5. This process is even more sustainable: You need less inks, paper, energy and produce far less waste.
6. You considerably streamline, optimize and speed up your entire production process. This is a very important point. Without the need of changing over special inks for every single print job – or even for one job, if there are so many spot colors used that you are unable to print the job in a single run – you have a faster throughput, you have no make-ready times or additional cleaning and wash-up times of the presses.

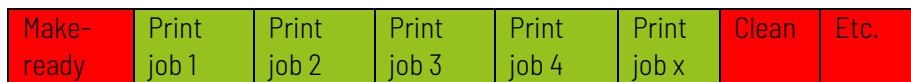
The picture below visualizes on an abstract level these aspects, before expanded gamut printing and after making use of this technology.

Schematic diagram of a standard printing workflow with spot colors



During the “red phases” your machine is out of production and no longer producing revenue. If you need 60 minutes to prepare the machine including changeover of spot inks, anilox, cylinders and to adjust pressure, inks and register them again, this will take you 3 hours plus cleaning time.

Schematic diagram of the expanded gamut printing workflow without spot colors

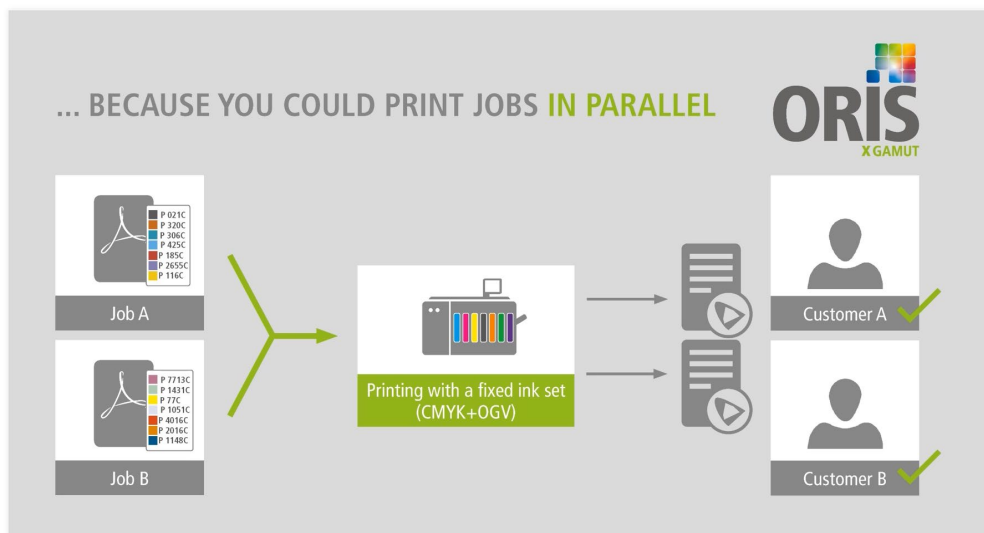


As you can print the jobs with the same (expanded fixed) ink set, you only need to prepare the press one time. After that, you can print several jobs for different customers containing various spot colors back-to-back.

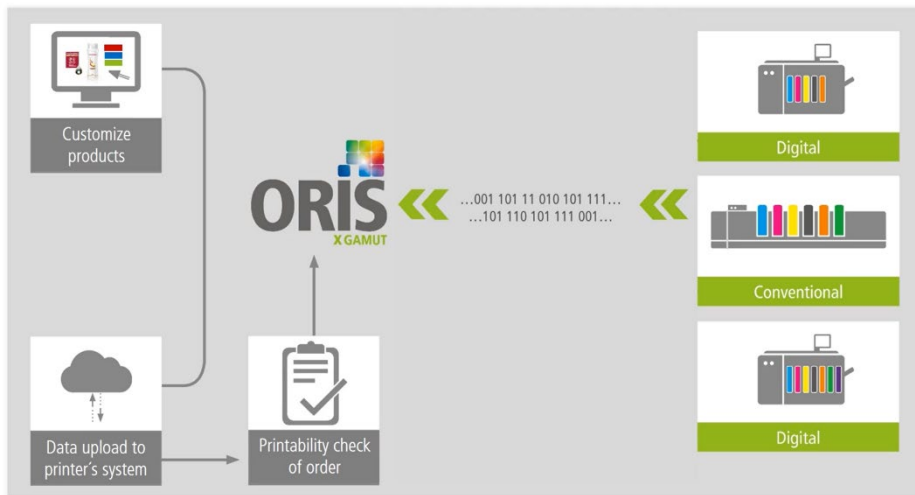
Please see a real calculation below.

7. You gain a lot of flexibility, because you can gang run print jobs, containing different spot colors. There is no longer any need to print one job after the other!

See the short clip here demonstrating the process.



8. Furthermore, there are additional benefits: Customers can use the calculations made by our software to empower their printing systems to distribute print jobs automatically to the individual presses in their shop that are best suited for a specific job to achieve the most accurate printing results. Read more about this intelligent and self-sufficient production process in the case study about [harder-online](#), one of the leading European digital packaging producers who prints customized boxes for [mymuesli.com](#).



Why haven't we done this for years?

Well, the concept is not new and there have been many use cases for years, unfortunately available technology made the process more difficult to implement.

As you can imagine, on a technical level it is not as simple as it may seem. You require specialized software with well-thought-out and proven color conversion algorithms which makes it possible to properly convert the color information of each unique spot color to the intended ink set separation sequence with which you intend to print them. The calculation must be very precise and needs to take into account a lot of additional factors like the printing conditions, target substrates etc.

Today, intelligent software tools are available to print in this manner and offer the ability to take advantage of these great benefits.

How do you conduct a successful implementation?

We recommend and underline how important it is to use a professional color management software, which has been specially developed for this particular purpose.

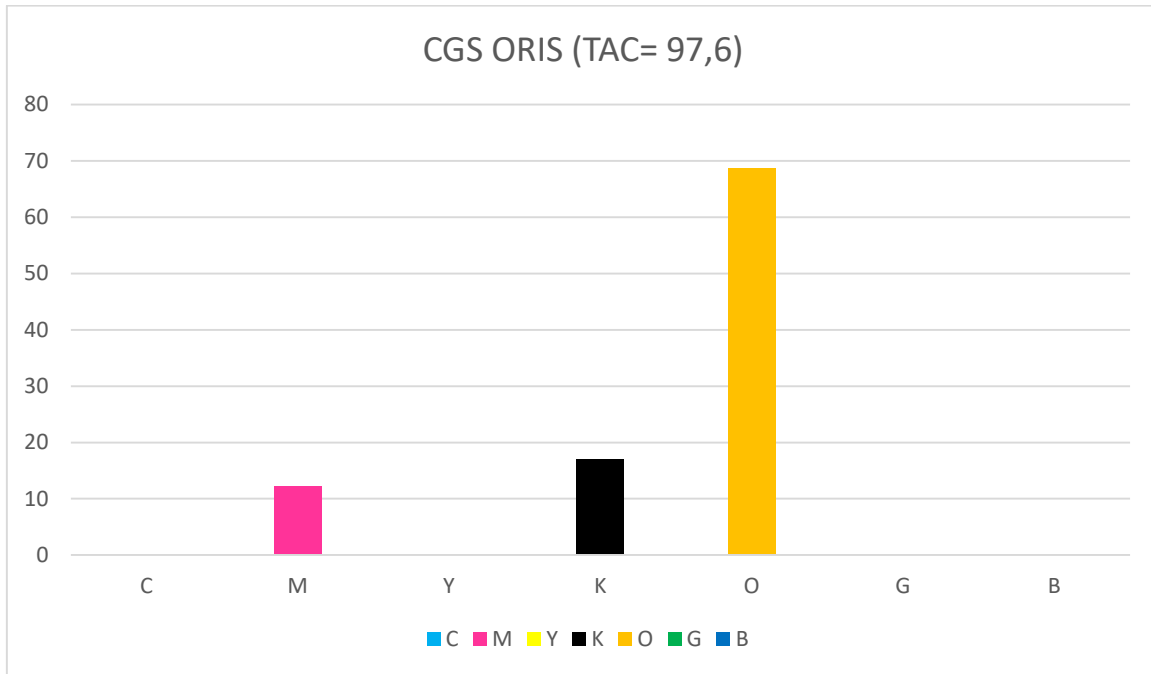
Our software for multicolor printing, [X Gamut, was launched in 2018](#). The software delivers a simplified wizard based tool which guides the user through the entire process, with a feedback function and process control to assist the user – no matter how much color management knowledge or experience he or she may have – to conduct the process easily, quickly and reliably.

The software ensures that the spot colors of your print jobs can be accurately reproduced and considers of course important “multicolor rules”. That means, for example, that every spot color is converted with a maximum of three process colors of the fixed ink set. People in the printing industry know that this is very important, because otherwise, you could have moiré effects in your printed output. But, some studies about multicolor printing showed that not all expanded gamut tools respect that basic rule.

Additionally, this has an interesting side effect, because you can save on ink usage at this stage. If you use the right software and the spot color is reproduced by a maximum of three inks instead of

five or more, you can have a greatly reduced total ink coverage. There is a huge difference between the available tools on the market and you must research that. And at the end, this not only guarantees an optimal quality, it saves money for you, too.

Example: Calculation of PANTONE 2433 C with X Gamut and Landa S10 and CMYK0GB (Delta E 0.41)



In the following diagram you see more examples of spot colors and the “translation” of their DNA into the appropriate inks used on the machine. It also proves that they are reproduced with three or less inks. In addition, the software helps you to understand if your quality requirements are achieved.

Color	Info	L	a	b	C	M	Y	K	Or	Gr	Bl	Opacity	Level	dE2000	Strict	Std.
PANTONE 504 C	S	24.0	22.7	2.8	0.0	71.9	0.0	68.1	38.7	0.0	0.0	0.0	1	0.41	2.0	5.0
PANTONE 374 C	S	87.9	-25.8	50.9	0.0	0.0	47.1	0.0	29.7	0.0	0.0	0.0	1	0.41	2.0	5.0
PANTONE 344 C	S	82.3	-24.0	8.5	6.7	0.0	0.0	5.6	0.0	32.4	0.0	0.0	1	0.41	2.0	5.0
PANTONE 2759 C	S	13.8	16.1	-46.7	46.0	0.0	0.0	46.2	0.0	0.0	98.7	0.0	1	0.41	2.0	5.0
PANTONE 2433 C	S	62.8	36.4	37.7	0.0	12.1	0.0	16.9	68.6	0.0	0.0	0.0	1	0.41	2.0	5.0
PANTONE 2378 C	S	30.7	0.9	-22.2	24.4	0.0	0.0	56.3	0.0	0.0	44.0	0.0	1	0.41	2.0	5.0
PANTONE 2296 C	S	89.0	-18.7	56.0	0.0	0.0	50.7	0.0	18.0	0.0	0.0	0.0	1	0.41	2.0	5.0
PANTONE 2238 C	S	38.1	-32.1	-19.0	84.1	0.0	0.0	43.5	0.0	24.5	0.0	0.0	1	0.41	2.0	5.0
PANTONE 2207 C	S	60.6	-12.3	-22.2	38.8	0.0	0.0	20.8	0.0	0.0	8.9	0.0	1	0.41	2.0	5.0
PANTONE 2187 C	S	26.7	-9.5	-38.1	87.4	0.0	0.0	44.2	0.0	0.0	45.2	0.0	1	0.41	2.0	5.0

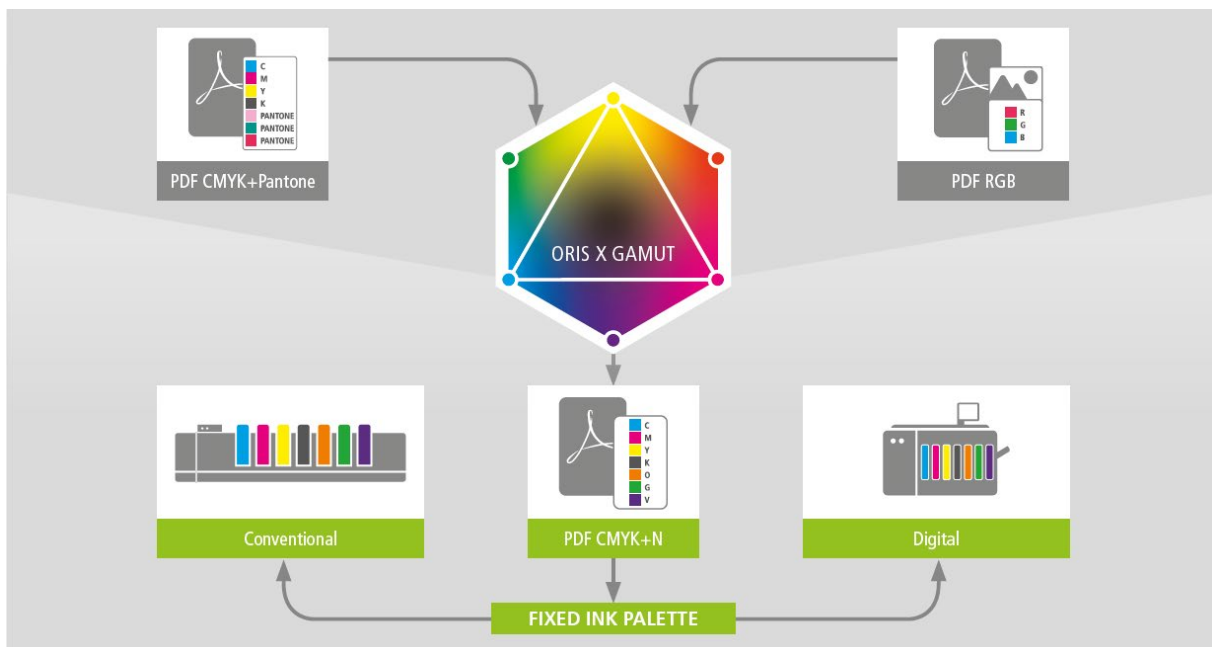
[X Gamut received the European Digital Press Award \(EDP\)](#) for the best color management software in 2019 during FESPA. The technical committee highlighted that: "Seven-color (or multi-color) printing is becoming increasingly popular. X Gamut is the perfect tool to support both digital and offset printing as well as a hybrid environment."

This leads us to our next main question: **Which are the main application areas?**

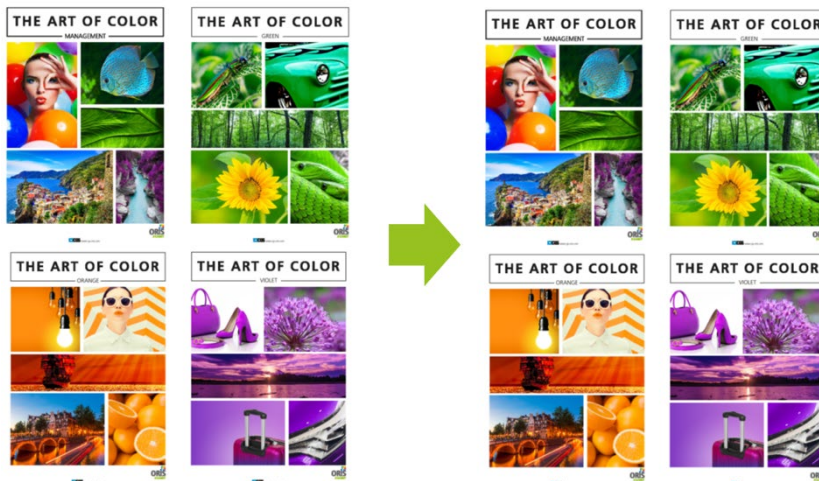
Everywhere spot colors are used and machines with more than four colors are available, X Gamut will be beneficial! As the jury of the EDP award commented, you can use our expanded gamut tool in a digital as well as a conventional printing environment or, of course, in a mixed production scenario.

In many cases, our customers use the software as a "spot color alternative" as described in this article and printing companies replace and reproduce spot colors inks – which they have traditionally used in their printing presses to print these spot colors – by an expanded fixed ink set (CMYK+X).

But, the second popular application area is in photo book printing as X Gamut is able to convert PDF with RGB data, too, and at the same time. Just drag and drop your PDF's in!



This means the tool does not only help to leverage the full gamut of the press and ink set so that spot colors can be precisely reproduced – it also applies and works for images (in parallel). Thanks to the extended gamut they can be printed brilliantly in all their detail.



Brilliant images with better saturation. You can [request](#) samples to see for yourself.

In addition to an easy to use wizard and a fully automated process, which speeds up the workflow and helps to avoid user error, many people like that you only need one software solution. X Gamut is client and server in one application – in many other cases you need two or more tools, which is more expensive and complicated to use.

X Gamut in practice

The software is in use today with many different machines, like digital presses – for example on several HP Indigos like 5600, 6800w, 6900w, 7900, 12000 or DURST Tau 330, Screen TruePress Jet L350UV, KBA Color Press, Epson SureColor LabelPress, Landa S10 – or Flexo Offset like COMEXI C18 – or Offset presses like Komori Lithrone, Heidelberg CD-102-8P, 106XL and manroland evolution 700. It can also be used in large format printing or industrial printing. There are so many devices in the market not being utilized to their full potential!

Let's take a closer look at the manroland press with its use of seven colors! One installation was done in China, at one the country's largest printing groups ZRP. They are recognized as one of China's Top 20 printers and the largest manroland user worldwide with approx. 300 employees and 120 brand customers.

One of the first exciting print jobs they did with X Gamut was an air freshener package for a large globally recognized brand owner. It contained 13 spot colors. Normally they needed to print this job in two runs with their manroland evolution 700. After processing the file through our color management software and converting the spot colors, we enabled their ability to print the package designs very precisely with the use of CMYK-OGV. Removing the need for special colors all together!

[Read the full story here.](#)

The customer gained large benefits from using X Gamut as you can see in the following table which summarizes five live production jobs done with X Gamut. More than \$70,000 were saved during the project as well as huge time savings. In addition, press capacity increased approximately 40%.

Customer	SKU Count	Spot colors	Plate Changes	Time Savings / Run	Time Savings Total	Efficiency cost savings	Run Length
A	741	80	740	30 min	376	\$51,874	2151476
B	106	5	105	30 min	52.5	\$7,361	310528
C	151	20	150	30 min	181	\$10,515	1726585
D	13	15	12	30 min	6	\$841	340249
E	16	10	15	30 min	7.5	\$1052	231792
Total Efficiency Cost Savings						\$70643	

In Summary

Special colors are especially eye-catching and really important for every brand owner! A large global player and customer summarized that very impressively when he said: "Our brand colors are our crown jewels; they always need to be perfect!"

But to work with spot colors requires effort and expense for all companies involved. Extra inventory, higher prices, frequent color changes and subsequent wash-up and press downtime all add up to reduced flexibility in job processing and significantly impact the whole production workflow. As a result, the printing press is not used to the best of its ability and productivity drops. That costs time and money.

Our software tool X Gamut is a fully automated color management workflow software for extended color printing on digital and conventional presses. It helps all printing houses using an expanded color standard, fixed 7 or 8 color ink set to accurately reproduce spot colors and to print brilliant images, in the case of photo books for example.

That means: No need to mess around with special inks. The perfect match of software features and intelligent workflow tools in **X Gamut** enable printers to leverage the full gamut of the press and ink set so that spot colors and images are brilliantly reproduced in all their detail – all without the need for special color inks. This not only considerably streamlines the production process, but also helps to tremendously reduce cost - for printers and clients alike.

✓ **Accurate spot and brand color reproduction using a fixed ink set (CMYK+X)**

✓ **Brilliant images**

✓ **Reduced ink costs and inventory**

✓ **Huge time savings due to faster make-ready times and less cleanup**

✓ **Faster job throughput and increased productivity**

✓ **Optimized machine utilization plus more flexibility**

✓ **More efficiency, increased capacity and higher margins**

✓ **Sustainability: Less ink and paper used, less energy and reduced ink waste**

✓ **Better prices and service for customers**