



## History, Reality & Future of PDF 2.0 from a realistic Packaging point of view.

There are many vendors right now talking us about the benefits for the packaging industry about embedding Spectral Color Information for the Spot Colors in the PDFs. Some years ago, ORIS came with his CXF ToolBox, and also GMG, X-Rite, and now even ColorGATE and other RIP manufacturers are now offering to the industry “solutions” around this new standard. But what is PDF 2.0? it’s true it can help me in printing in a more consistent way the Spot Colors? what other benefits it brings to us? and the most important one, is this technology ready nowadays?

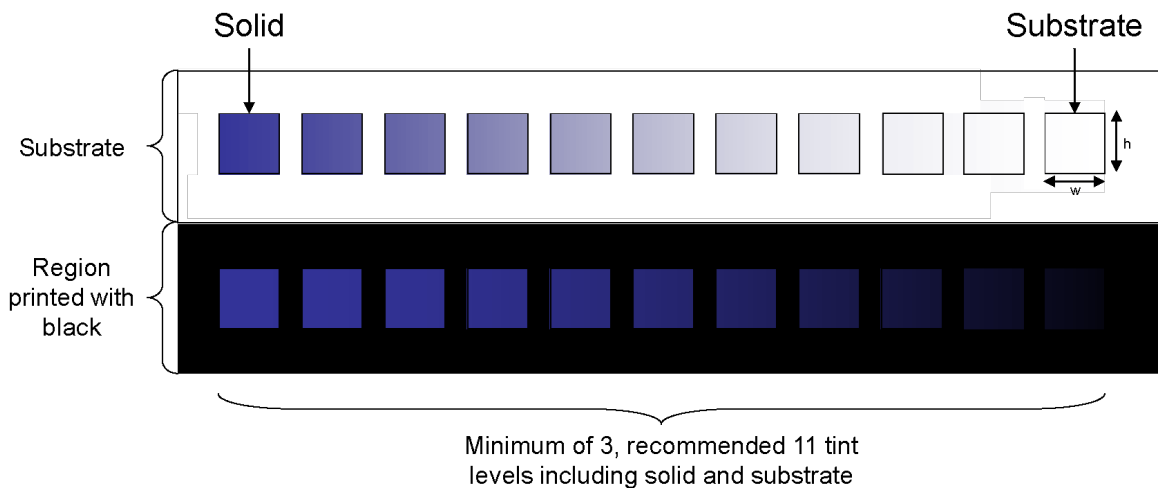
Let’s make a short resume of the history until today. All this new technology is formed around 3 different (but related) concepts; **PDF, ICC & CXF**.

**PDF** (Portable Document Format) is the industry standard for exchanging graphic information between programs. Was promoted by Adobe for replacing the limitations of EPS (Encapsulated PostScript). EPS was not able to embed ICCs; all objects were together instead of grouped by pages and much more technical differences that are not important for the topic we’re talking right now. We’re normally creating PDF documents from the Adobe Creative Suite (Illustrator, InDesign, Photoshop, Acrobat, Distiller). In a PDF, you can embed images, vectors, texts... so all you need for sending a “digital design”. For printing, we’ll be normally selecting PDF/X-4:2010 as standard. This will create a PDF 1.6. From the Adobe Creative Suite, we’re actually able to create up to PDF 1.7. The ISO standard that defined how to create this PDF documents is the **ISO 32000-1:2008** (PDF 1.7). Recently, ISO has released a new version of this standard, the **ISO 32000-2:2017** (PDF 2.0) that specifies how to create PDF 2.0. It’s funny, but it’s actually impossible to create a PDF 2.0 from Adobe products and was Adobe the company that was promoting the update of this ISO 32000. However, the situation can change in few months, and with the last Acrobat release (May 2019) a new preflight has appear, allowing to end users detecting if the PDF uses any PDF 2.0 feature. This is the first time the industry sees the word “PDF 2.0” in an Adobe product, so it’s a very significative and important information.

**CXF** (Color eXchange Format) is one of the industry standards for exchanging color information between programs. Was promoted by X-Rite for replacing the limitations of CGATS (Committee for Graphic Arts Technology Standards). In a CXF you can embed list of colors and color information in different color models (RGB, CMYK, Lab, Spectral...). The ISO standard that defined how to create this CXF documents is the ISO 17972. This ISO has been updated several times recently: **ISO 17972-1:2015** (CXF/X), **ISO 17972-2:2016** (CXF/X-2), **ISO 17972-3:2017** (CXF/X-3), **ISO 17972-4:2018** (CXF/X-4).

**ICC** (International Color Consortium) is the standard for exchanging calibrations & characterizations between programs. Forgoing about the beginnings (1.0 & 2.0), the actual versions are defined by ISO in the ISO 15076. This ISO has also pass through different versions so: **ISO 15076-1:2005** (ICC 4.2), **ISO 15076-1:2010** (ICC 4.3), **ISO 20677:2019** (ICC 5.0). Actually, there aren’t commercial packages been able to create or apply ICC 5.0 (iccMAX). You can create ICC v4 compatible with iccMAX from X-Rite i1Profiler 1.8.2, but these profiles are in fact 4.3 profiles with some of the 5.0 tags.

Technically, now it’s possible to save a Spot Color information in Spectral format, with a minimum of 3 patches (0%, 50%, 100%) over white and black substrates and a recommendation of 11 patches (10% steps from 0 to 100) under CXF/X-4 format.



This CxF/X-4 information, can be embedded into an ICC 5.0, that can be embedded into a PDF 2.0.

Let's remember when the required standards for been able to make all this has been released.

- **ISO 32000-2:2017** (PDF 2.0) (July 2017)
- **ISO 17972-4:2018** (CxF/X-4) (January 2018)
- **ISO 20677:2019** (ICC 5.0) (February 2019)

This basically means, the final formal format of all this concept has less than. 4 months since the date I'm writing this article. I know all this ISO are based in previous documents (for example the ISO 20677 is based in the iccMAX specifications released in February 2018), but until the final ISO is released, everything is susceptible to changes. This allow you to find funny stuff like the PSD sample in the International Color Consortium web for showing the use of spectral spot inks ([http://www.color.org/resources/ChunkyBar\\_CMS\\_CxF.PDF](http://www.color.org/resources/ChunkyBar_CMS_CxF.PDF)) a PDF 1.6 with an embedded ICC 2.4 (ISO Coated v2 (ECI).icc) and CxF information if spectral format created in 2016 "following" a standard published in 2018... I've not check personally if this particular CxF is actually consider CxF/X4 or not, I know ISO takes a lot of time in publishing the standard, but I also know sometimes they change the initial specifications when the standard is finally released.

But let's forget about the date of release of commercial applications focused on this technology as right now, all of them can check (and fix if required) his final implementations as all the ISO has been finally released and let's focus on the theoretical benefits of this technology.

**The first benefits** of having the Spot Colors defined in Spectral format is you can compensate them for taking into consideration the final ambient light. Regarding this point, I'll ask you if you know where will be viewed your prints and if yes, if the light there is constant (no exterior, no windows, and so on), and if yes, if you can go there and take a measurement of this light, and if yes, if the light is homogeneous and the measurement you take is the same everywhere.... As you can easily understand, this is more a marketing point than a practical point. Even more, right now, only with Lab measurements, you can also compensate the final print with Ambient Light ICCs (Abstract Profiles), so technically you can do the same right now. It's true you can do it with more precision if all data is in Spectral format, but I'm not sure if I'll be able to find a single end user that will really need this level of precision as we should be talking only of standard celine lights environments for



example, as less critical environments (supermarkets, retail shops, and so on), can be perfectly adjusted right now with the actual level of the technology).

**The second benefit** of having the Spot Colors defined in Spectral format is you can make a better simulation of the different %. So, if you're printing a given % (not a 100%), you could simulate with more precision the real dot gain as you've this information in the CXF/X4. This is true, but it's also true the **ISO 20654:2017** defines how to calculate the SCTV (Spot Color Tone Value) and these curves can be applied to a whatever actual spot color defined in Lab in whatever actual PDF 1.x with a simple curve. Even more, basically, for taking benefit of both ways (the actual one or the new one defined by the CXF/X4) you should measure the different % of the spot color with a Spectrophotometer. The difference is right now, you've only to measure it over your actual media and in the new standard, you've also to measure it over black substrate. Ok, I know, there are solutions in which the black measurements are interpolated from the ones taken under white, but the, what difference exist between what you can do right now and you're not doing and the new way?

**The third benefit** of having the Spot Colors defined in Spectral format is you can calculate in a much more precise way the overprint of two or more spot inks. That's 100% true, but it's also true, creating the information doesn't mean using it. I mean you've not only to add all this information into the PDF, the RIP has also to be compatible with this and even more, internally use it in the correct way, as right now, this same PDF of the ChunkyBar I comment before is been printed by 99% of RIPs using the Lab values also defined on it for compatibility purposes, not using the Spectral information embedded into it for this purpose. And one additional note about this point. This will be valid for the proofer, so for the printer making the proofs, not for the press in which you're making the production, as on this press, you've to work with SCTV as you're printing really with spot inks.

My final conclusions of this article are the following ones.

- We're finally ready for been able to use this new amazing technology that basically will allow us to create a better proof in paper of the final production if we measure the real SCTV we have in our flexography lines.
- For accessing to this new technology, we'll have to buy a closed solution as right now the open and standard applications and rips are still not compatible with it.
- I really don't understand why people take cares of implementing these solutions if they even don't control the SCVT of his printing devices.

For finishing, running is good, you go faster, but for running, first you've to learn walking, and unfortunately mainly all companies are still crawling. This new PDF 2.0 & ICC 5.0 & CXF/X-4 bring us lots of new possibilities, but I believe you should first take profit of what you already have in your hands and probably you're even not using.

A handwritten signature in blue ink, appearing to read 'Juan Martorell', with several horizontal lines drawn through it.

Juan Martorell  
ColorInLab Color Consulting S.L.  
Thursday, June 27, 2019