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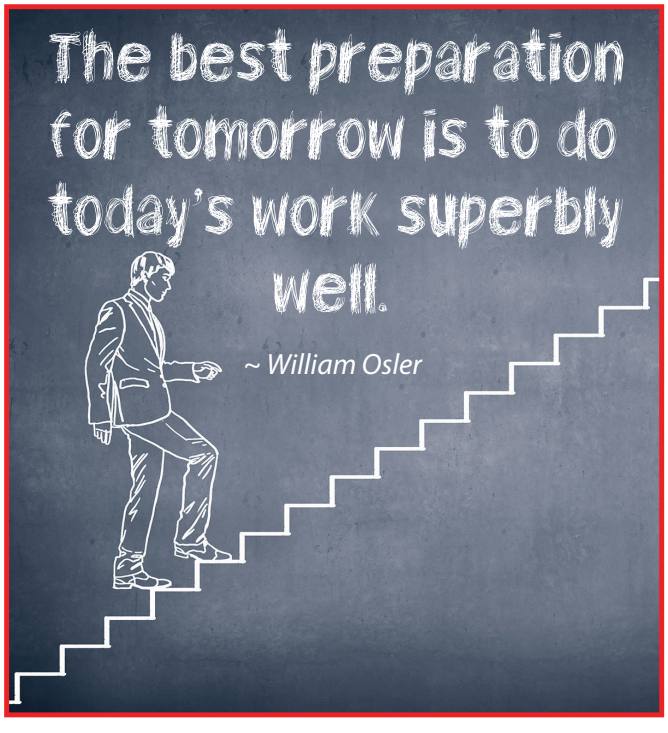
Tips of the MONTH

YOUR SUCCESS WILL BE **AFFECTED** BY THE QUALITY AND **QUANTITY** OF NEW IDEAS YOU SUGGEST. ~ *Brian Tracy*



Experience is not what happens to you. It is what you do with what happens to you.

~ *Aldous Huxley*

Vision without action is a daydream.
Action without vision is a **nightmare.**

~ *Japanese proverb*

The Secret to Full Color Screen Printing

April 10, 2012 by Joshua Van Horsen

Ever wonder how t-shirts are made that feature photographic quality design, in full color? This articles takes an in-depth look at the subject of cmyk printing and color separations, and their uses in screen printing. This casual approach to a difficult subject, should provide you everything you need to know to start producing full color artwork for fun and profit.

So, you're interesting in finding out about creating color separations for 4 color process screen printing?

To tell you the truth, you're not alone. Many people ask me, but I have been hesitant to trust this information with you (or anyone else for that matter), because of the power you will have at your finger tips once I am through. This isn't a power to be taken lightly, with this power you can change the world.

Let a professional do your separations for you.

See, that wasn't so hard. What? Really? You want to do it yourself? I mean, wouldn't you rather just hire a professional, pay outrageous fees, and not have to bore yourself with the advanced mathematics and the tedious process of memorizing formulas and stuff?
Alright then.

What is CMYK anyways?

Well, by Wikipedia's definition, "CMYK is a subtractive color model used in color printing". Yup, that pretty much sums it up.
So, now that we have that out of the way, let's get onto something interesting….What? You still don't understand? Really? I thought that was pretty clear, but I will try to explain it for you.
This whole CMYK thing is based on the mixing of specific pigments in particular percentages to create a wide range of colors. Often times referred to as 4 color process. These specific pigments are as follows:

- C=cyan
- M=magenta
- Y=yellow
- K=key (black)

Now, the reason this is considered a "subtractive color model" is because the higher percentage of cyan, magenta, and yellow I smear onto a white sheet of paper, the less amount of light that will reflect through, ultimately creating a black (in this case, smudge) on our paper.

Why is black referred to as the letter "K" in CMYK? Well, back in the old days, when people really did use silk for screen printing, the word for black was actually Klack. What? Oh.. well, apparently that isn't true. Allegedly, the K actually stands for Key, as in the key plate used by a printer. I am being told that it was referred to as the key plate because it generally contained the artistic detail for a piece and was usually printed in klack.
Er, ok…
black.

Ok, thanks for the tip! So can we make a screen now?

Hold up a second. There is actually a bit more to discuss before we can dive in and start burning screens. Understanding what CMYK is and why it does what it does is really only the first step to moving forward into four color process printing.
Next we need to understand color separations. I had mentioned earlier how specific percentages of these particular pigments (cyan, magenta, yellow, and black), could be combined to create a wide range of colors.

Just for kicks, lets pop open Photoshop and take a quick look at the percentage breakdown of a color.
How about this grass green?
In order to stay this solid green, he really needs to maintain some tight percentages. If one of these percentages starts to slip, he starts to lose his solid reputation.

So how does all this nonsense relate to color separations?

Well, there is a point, I know it. Let me see… We took a look at a color (in this example, green), we examined the percentages that make him the successful color he is:

- Cyan = 75%
- Magenta = 5%
- Yellow = 100%
- Black = 0%

We understood that all together, these color percentages make him what he is, but when they are separate, they are just percentages of color by themselves. Oh snap! Did you see what I said? When they are separate! So, pulling these colors away from each other into individual instances, is the act of creating color separations. And with color separations, we can make screens!

Wait a second, how are we going to print a percentage of color through a screen?

Oh, ya.. I almost forget about that part. Halftones. What? No, no it's not a ska band. A halftone is the series of little dots you see when you look at a photograph in a newspaper. Halftones are dots of varying sizes and angles. The smaller the dot, the more white from the paper shows through effectively creating a lower percentage of color. The larger the dot (yup you guessed it), the higher the color percentage and the less white that shows through. When these dots are angled just right and printed over each other with their corresponding ink color, the effect is breath taking. These little dots, of varying sizes and colors, standing up against their diversities, united under a common good, to change our perception of the world around us. Or, in other words, they just appear to make some really pretty colors.

Ok, Cool! I got it, colored dots is the key. Let's do this!

Wait one second mister, we still need to talk about mesh counts, diameters and LPI's.. Oh My!

Ok, yeah, I admit… that Wizard of Oz reference didn't really work. But, I think after everything we have been through together, we can let that one slide.

Ok, so where do we start. We have discussed how CMYK color separations require halftones in order to achieve the multitude of colors we want in a 4 color process image. There has been mention of dot sizes and angles that are necessary to achieve this effect properly. You may have noticed that I have yet to give you any solid numbers as far as dot sizes or angles for your halftones. I didn't do that so you would read through to the end of this article…, if that's what you're thinking. I did that because this is where I supply you with the facts and figures you need to make this work for you in the real world.

Let's start at the end and work back to the beginning. Mesh Count and thread diameter. Mesh count is the number of threads, per inch, that makes up your screen. Professional screen printers generally utilizes a screen with a mesh count of about 255 threads per inch and above, but typically mesh counts can range anywhere from 110 to 305. To make matters worst, there is also different thread diameters for screens. The higher your thread diameter in combination with your mesh count, the finer detail your artwork can contain, but also, the less ink that gets pushed through the screen. Inversely, the lower the thread diameter, the more ink that can be pushed through the screen, but the ability to maintain high details is lost.

So how do you go about choosing a mesh count? Well, for the sake of this article, and the process of 4 color printing on a screen, we want to go with the highest possible mesh count with the largest diameter of threads suitable for the material we are printing to. The higher our mesh count, the tighter our dots can be when we create our halftone.

Now, this is where the magic happens. In order to output a proper halftone, using the highest possible quality for our screen, we need to do some math.

First, we need to look at our mesh count, we can call that M. In order to figure out the optimal dot size of our halftone for our screen, we need to divide M by 3.5. Why 3.5 you ask? Mostly, because I like that number and have good result with it. But, because there are differing ideas of what number to use, most ranging anywhere from 3 – 5, feel free to experiment and let me know what works best for you. The quotient of this formula will become our LPI, or lines per inch.

M / 3.5 = LPI

Our LPI will dictate how many lines per inch we will have in our halftone. The higher our LPI, the more dots we can fit in per inch in our halftone, allowing us the ability to print a higher quality image. The LPI of your halftone can have a huge impact on the quality of your print. Below is a quick break down of typical LPI standards for reference.

- Screen Printing 45-65 lpi
- Laser Printer (300dpi) 65 lpi
- Laser Printer (600dpi) 85-105 lpi
- Offset Press (newsprint paper) 85 lpi
- Offset Press (coated paper) 85-185 lpi

Let's do a quick example of figuring out our LPI, and then we can move on to the awesomeness of angles. Let's say I have a screen with a mesh count of 220 threads per inch. If I divide that 220 mesh count by 3.5, I get a quotient of roughly 63. Looking at our reference table, that will produce a lower quality halftone than used in newspapers, but fairly average for screen printing. While it might be ok for this example, I would probably look at buying a higher mesh count screen to improve my halftone frequency.

Also, as a side note, if you don't have the screen yet, but now you want to achieve a halftone with an 85 lpi, you can always reverse the math to come up with the mesh count you should purchase. Always remember to round up if possible. Obvious? Maybe, but I thought I'd mention it.

LPI * 3.5 = Mesh Count

Angles, Don't believe the Hype

Ok, we've made it this far, just a couple more paragraphs and then the big payoff.

The final key to producing accurate 4 color halftone separations for output is the screen angle. Not the silk screen, the halftone screen! The series of dots that create the halftone are referred to as a screen. It is this screen, that once overlapped with the other color screens creates the final image. Each separation screen is printed at its own angle to prevent what is commonly referred to as the moiré effect. Moiré produce a sort of distorted, dizzying effect, and can ruin a good print job. To prevent moiré patterns in your prints, a general rule of thumb is to offset each screen angle by 15 to 30 degrees.

Here is a sample of suitable screen angles:

- cyan = 75°
- magenta = 15°
- yellow = 105°
- black = 45°

With these angles in hand, and all the knowledge you gained earlier, you are ready to start outputting separations for creating your screens.

Mastering Water-Based Inks

The time is ripe for printers to learn how to use these products properly.

(September 2015) posted on Tue Sep 01, 2015

By Rob Coleman

Prior to the 1960s, water- and solvent-based inks were the first choice – the only choice, really – for apparel printers. In those days, the garment decoration business was certainly not what it is today in terms of sheer numbers. However, screen printers that did image T-shirts then struggled with a number of production issues: ink transparency, drying in the screen, emissions, stencil breakdown, curing, washfastness, storage, and more.

Then, in 1959, a gentleman named Don Pettry who worked for Flexible Products Company developed plastisol inks, changing garment printing forever. Plastisols used a PVC (polyvinyl chloride) resin and plasticizer to produce what is, in essence, liquid plastic. The inks were easy to cure, didn't dry in the screen or attack the stencils, presented no shelf-life considerations, produced a durable ink film, and had a good level of opacity to boot. They also enabled small entrepreneurs to get into the business by greatly reducing the cost of drying equipment. The forced-air units with long tunnels required for water-based inks weren't necessary; small electric dryers could cure this ink just fine. The development of plastisol ink was truly a game changer for our industry and a key factor in the rapid growth of printed apparel in the '70s and '80s.

Plastisol has been the king for a long time, but its fortunes have been reversing in recent years. Why is the industry moving back toward water-based inks? In my view, the two key reasons are brand requirements and fashion trends.

Brand/Retailer Initiatives

A number of major brands list PVC on their Restricted Substance Lists (RSLs), and more are following suit. Nike, by most accounts the top global apparel brand, began phasing out PVC as far back as 1998. Most of the other top apparel brands have some type of PVC restriction as well, including fast-fashion retailers Zara, H&M, and Uniqlo (brands that those of you with teenage daughters surely know). These merchants are rapidly gaining a much larger presence in the US with the downslide of the "Big A's" – Abercrombie & Fitch, Aéropostale, and American Eagle – brands that teenage consumers have abandoned in recent years.

To understand why PVC is being restricted by so many brands and retailers, we must first understand what PVC is and where it is used. The fact is, PVC-based products are everywhere in all aspects of our lives. PVC is the third-most widely produced polymer after polyethylene and polypropylene. It comes in two primary forms – rigid and flexible. Rigid PVC is used primarily in the construction industry for products such as vinyl siding and pipes. Flexible PVC is found in a host of things including insulation, inflatable products, patio furniture, banners, anti-fatigue mats, toys, and, yes, plastisol screen-printing inks.

So what, exactly, is the big deal about PVC? It really boils down to three issues. First, the vinyl chloride monomer that is used to create PVC pellets is a carcinogen in its raw material form. (Upon polymerization into the PVC resin, however, it is inert.) Second, certain types of plasticizers known as phthalates that are used to soften the PVC and make it pliable are known to be hormone disrupters. Most US plastisol manufacturers no longer use these chemicals, having switched to non-phthalate plasticizers. And lastly, improper incineration of PVC releases dioxins into the environment, which is the real crux of the matter.

Here is a trivia question: Who remembers the US government banning phthalate plasticizers in screen-printing inks under the Consumer Product Safety Improvement Act (CPSIA) in 2008? Do I see some hands going up in the back of the room? Well, the fact is that phthalates were only banned in children's toys and child care articles (defined as items designed to facilitate the sleep or feeding of a child under the age of three), and of the many phthalates used commercially, only six were specifically listed. So do screen-printed apparel items fall under this legislation? If you are printing baby bibs or bed sheets, they certainly do. But what about a superhero design printed on a T-shirt marketed to a 10-year-old boy? I don't think it meets the definition, but this type of product has been encompassed in the anti-phthalate effort.

To the best of my knowledge, there is not a single piece of legislation in the world banning PVC. So if legislation isn't prompting its removal from printed apparel, what is? It's happening because of brand and retailer initiatives, bans that have been prompted by social media campaigns and public pressure from consumers and organizations such as Greenpeace.

If you aren't convinced that the market is moving away from PVC inks, consider this: In early 2014, my company, the Textile Ink Business Unit of Nazdar SourceOne, queried key suppliers of plastisol and water-based textile inks about sales trends in the North American market. While the num-

bers varied slightly, the trend slope we saw was remarkably consistent, with all the suppliers we interviewed predicting a significant drop in plastisol's market share (currently about 70 percent of garment ink sales in the US today in our estimation) through 2018.

Fashion Trends

One of the strongest trends in textile screen printing today is the growth of athletic apparel – "athleisure," as it is known. Though sports involvement is actually down, wearing athletic clothes has become fashionable due to comfort and style. According to the NPD Group, sales of general apparel (100-percent cotton and traditional poly/cotton blends) declined in the last 12-month reporting period while activewear exhibited significant growth over the past several years. Activewear sales have grown to $33.7 billion, representing 16 percent of the total apparel market

Apparel and Activewear (Dollar % Change)

	Total Apparel (w/ Activewear)	Total Apparel (w/o Activewear)	Activewear
12 months Jul'11-Jun'12	+4 percent	+3 percent	+8 percent
12 months Jul'12-Jun'13	+4 percent	+3 percent	+10 percent
12 months Jul'13-Jun'14	+1 percent	-1 percent	+7 percent

Source: The NPD Group, Inc. / Consumer Tracking Service 2011-2014

The other important trend affecting ink selection is that special effects have come back in a big way since their decline after the 2008 recession, and will continue to be an integral part of many branded designs. Numerous special effects are available in water-based chemistries, including flock, foil, gels, reflective, glow in the dark, color change, puff, suede,

pearlescent, glitter, metallic,

and cracking inks. Regarding cracking inks, one advantage water-based chemistry has over plastisol is the availability of a self-cracking formulation that doesn't require the garment to be stretched after curing to get the desired effect as with plastisols and many water-based products; instead, the effect happens in the dryer as the ink film is cured. Below is a close-up of a print where a self-cracking ink was used for the underbase and top coat.

Reflective inks, in particular, seem to be making a comeback, especially for branded sportswear. A relatively new, exciting special-effect product available in water-based versions is a clear reflective ink, which can be overprinted on top of flash-cured colors to create multicolor reflective e designs with the use of just one flective ink screen.

Finally, consumers continue to demand softer garments, and thus softer prints. You cannot beat the softness of using traditional water-based inks for light goods and discharge and/or high-solids water-based inks for darks. For a few years now, there has been a trend among plastisol printers to use a discharge underbase instead of a white plastisol on dark, 100-percent cotton garments.

This enables them to overprint with soft-hand plastisols through finer mesh counts, yielding a significantly better hand than if the job had been done with plastisol alone.

News from Printex

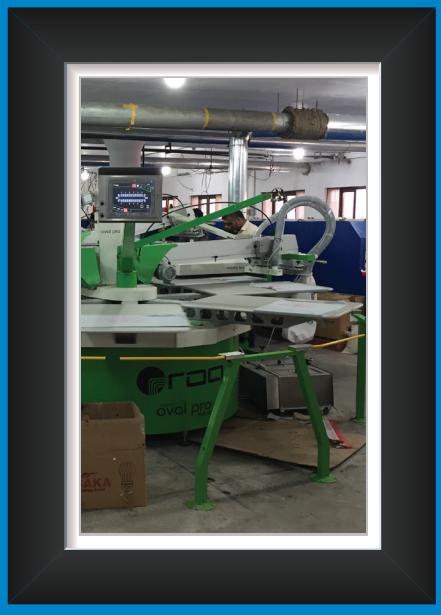
By the Blessings of Allah Almighty, we booked another Roq Oval Pro for M/s Style Textile, Lahore.

Mr. Lasantha Peiris from Fujifilm Sericol Visited valuable customers and advise them Technical Tips.

Mr. Vitor Simao & Mr. Jeorge from Roq International installed their First Oval Machine at M/s Combined Fabrics.

Here are some pics of Installation.





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