

## One Way Vision Managing Ink Load

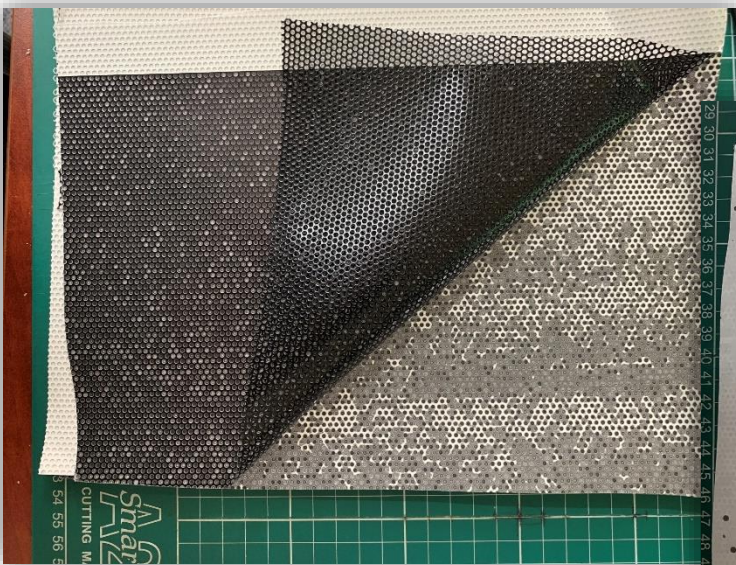
12 October 2021

### Background

**Managing the amount of ink laid down while printing is critical for perforated vinyls.** This is because if too much ink is printed, the liner becomes super saturated and can no longer absorb any further ink. This means ink bleeds into the adhesive layer where it chemically reacts, **resulting in significant reduction of adhesive strength** and migration into the PVC layer from underneath the ink bond coating layer where the face film becomes deformed permanently.

Refer to images 1 and 2 below of a sample perforated vinyl where ink overload has occurred. Notice the ink bleed between perforations on the backing sheet liner and through to the other side of the liner.

*Image 1: Sample of Ink Overload*



*Image 2: Sample of Ink Overload - Reverser Liner Side*



Why is reduced adhesive strength and ink migration an issue? Soon after applying the printed One Way Vision to a window, the **perforated film may curl and lift in the corners and along the edges**. In the worst case scenario, perforated vinyl may even tunnel or tent whilst printing, potentially causing print head strikes.

### Objective

The objective of this document is to provide guidelines to production managers and graphic designers, on how to manage ink load so that the backing sheet liner does not become super saturated, thereby significantly minimising and possibly eliminating the risk of application failure.

## Overview

Creating a successful One Way Vision sign involves a number of tasks in each of pre-production, production and post-production stages. Accordingly, this document has three sections, one for each of these stages. In each section, screen images and photos of perforated film samples will be provided along with specific instructions outlining our recommendations.

Please note, the settings and methods outlined here are only a guide to assist you. You may need to adjust according to your specific requirements, such as the type of printer, ink and software you have. In addition, your geographic location and the season of the year may also require different settings. Therefore, we strongly recommend that you conduct tests and set your system environment and settings to achieve the same objective.

**IMPORTANT: Performing a test prior to installation can minimise costly errors and help to ensure the success of your project.**

## 1. Pre-Production Stage - ARTWORK

Surprisingly, it is this first stage of creating artwork to be printed that proves to be a vital step and must be carried out correctly. **Digital printing is not as simple as clicking the Print button and hoping for the best.** Many problems and issues of digital print and sign jobs can be traced back to incorrect artwork.

Generally, the responsibility of artwork rests with graphic designers. This section assumes the reader has sufficient knowledge and the necessary skills to use Adobe Illustrator. However, the principles outlined here are also applicable to other design programs, such as Corel Draw.

### *Recommendations for Artwork*

1. Use vector-based artwork design software, such as Adobe Illustrator.
2. Do not use a single dark colour as the predominant colour for the background.
3. Use spot colour for the background colour.
4. Do not exceed 200% for CMYK combined value.

### *Use vector-based artwork design software*

When designing artwork for signage, we strongly recommend using a vector-based design software program, such as Adobe Illustrator. We recommend not using Adobe Photoshop or other raster-based programs. We have seen instances of “print ready” PDF and EPS files that graphic designers have given to a sign maker, but the files were simply an embedded JPG inside the PDF/EPS file format. This is not a print ready file. Sign makers cannot control the colour mapping and therefore ink load in such cases. PDF or EPS does not mean the artwork is vector based.

Using a vector artwork design program means that when the artwork is exported to PDF or EPS file format, the CMYK values for each colour is also saved. Therefore, when the RIP software loads the file with this information, if required, individual colours can be mapped to different CMYK values. **This step of colour mapping at the RIP stage is vital to managing ink load.** But with raster images, such as embedded JPG, colour mapping is generally not possible.

### *Do not use dark coloured backgrounds*

When a significant area of the background is a dark colour, such as black, brown, navy, or charcoal etc, it will cancel out the One Way Vision effect. If the One Way Vision effect is cancelled out when the film is on a window, then why even use a perforated vinyl for the sign?

For example, if your customer wants white lettering and a logo with a black background for their shop and car windows, then it will be better not to use a perforated vinyl as people outside will see into the building or car as if there was no film even there. In addition, one way vision lowers the resolution of graphics, so that the text may

even be unreadable to some people. Therefore, computer cut white vinyl and a digital printed logo would be better materials for this job.

Refer to image 3 below of a printed black background One Way Vision film installed on car. Notice how the One Way Vision effect is not there. That is, the tool bag and back seat and other areas inside the car can easily be seen. Visual privacy does not exist in this scenario.

*Image 3: Sample of Ineffectiveness of Black Background One Way Vision*



Consider a white background with black text and printed logo on One Way Vision. This scenario provides the greatest One Way Vision effect. That is, people outside when looking at the window will not be able to see inside during the day. If visual privacy is required, then this is a great solution.

Refer to Image 4 below of a white background One Way Vision film installed on a car. Notice how the One Way Vision effect is working quite well. The tool bag, back seats and other areas inside the car cannot be readily seen.

*Image 4: Sample of the Effectiveness of White Background One Way Vision*



## Use spot colour

If a dark background is unavoidable, then use spot colour instead of process colour when designing the artwork. Even though spot colour is typically associated with offset printing and process colour with digital printing, in this instance, spot colours are more easily mapped manually in the RIP software than process colour. **The manual colour mapping of a dark colour at RIP stage is the key to managing ink load.**

To use a spot colour, follow these simple instructions in Adobe Illustrator:

1. Create or select a shape object representing the predominant background colour.
2. Click the fill colour swatch drop down arrow and then double click on the colour you want for background.
3. Change the swatch name. Change colour type from Process Color to Spot Color. Color Mode needs to be CMYK. Select whatever values are relevant for the CMYK. In the example screen images 6 and 7 below, as black is common for background colour, we have set the CMY to zero and the K value to 100. This is called Pure Black. Click Ok. The black swatch icon changes now with a dot in the bottom right corner, this denotes it is a spot colour. Refer to image 8.
4. Export the file as PDF.

If the colour swatch was left as process colour, and even though the artwork file has CMY=0 and K=100, most RIPs will ignore these values and map to a different set of values, typically Rich Black, which is around C=80, M=80, Y=80, K=80. As this adds up to 320%, ink overload will occur. The maximum a liner can absorb is 200%. Make sure the CMYK values do not exceed this 200% maximum. It may mean that some dark colours, such as brown, navy, dark greens should not be printed. Consider using lower CMYK values.

*Image 5: Screen Image of Black Background as Process Colour*



Image 7: Process Colour Settings

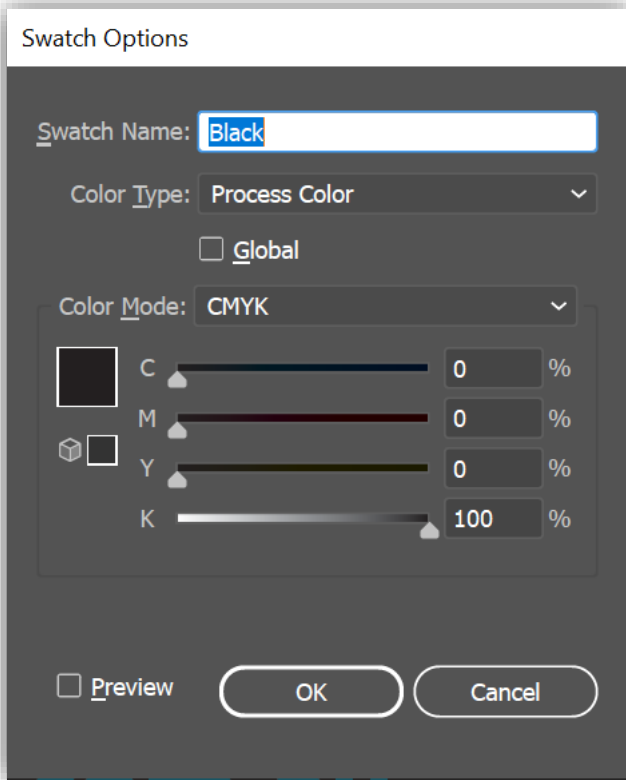


Image 6: Suggested Spot Colour Settings

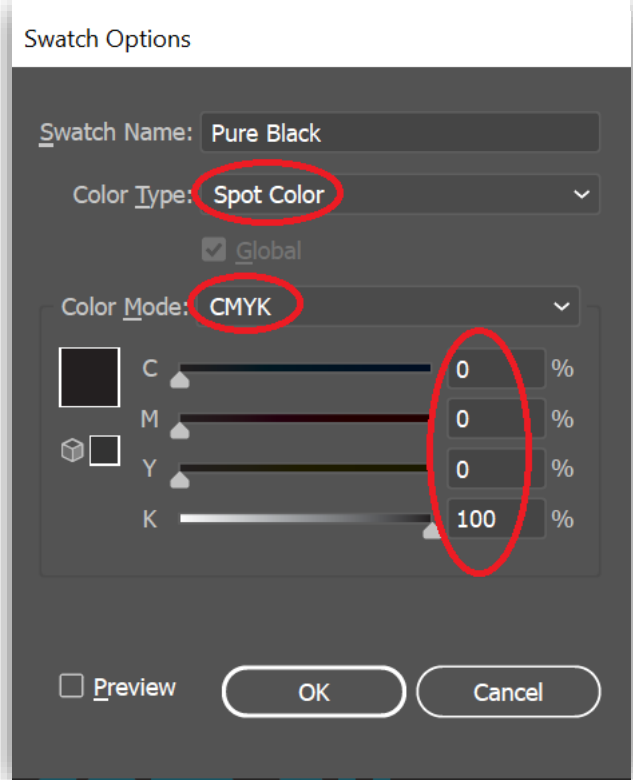
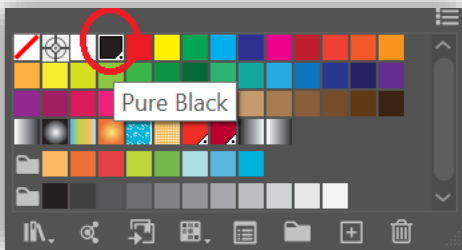


Image 8: Spot Colour Denoted by Dot in Bottom Right Corner of Swatch



## 2. Production Stage - PRINTING

Assuming the steps outlined in Section One: Pre-Production Stage – ARTWORK have been followed; the artwork file is now ready to print. Section Two: Production Stage – PRINTING contains steps to remove the risks associated with ink overload however the steps below will only work if the steps in Section One above, are performed first.

The first step is to select or create a profile for Clear Focus One Way Vision film. Using the correct ICC profile for your print job is very important. Many, if not most film and printing issues such as ink overload, can be traced back to an incorrect profile.

A profile is a file that contains information your printer machine needs to ensure colours are printed correctly and consistently every time. A profile contains specific information for a make and model of printer, make and version of RIP software, type and brand of ink and type of perforated vinyl film. A profile also includes other variables such as speed and temperature. All these things may affect the printed colour and the amount of ink laid down whilst printing.

Whilst it is very important to use the right profile when printing onto films, it is not feasible for us to provide you with a profile. This is because there are too many variables and combinations of these variables, making it not economically viable to create a profile for every permutation. Assuming multiple wide format digital printer manufacturers, each with multiple past and present printer models, various RIP software programs, each with past and present versions, plus many brands of ink type of ink, the number of possible profiles that need to be created is in the order of millions.

### *Profile Recommendations*

1. Please visit <http://www.clearfocus.com/support/printer-profiles/> in the first instance. There may be a profile that meets your criteria. Try using a profile that closely meets your criteria, such as same printer but different model. There is also other helpful information for profiling.
2. Visit your printer manufacturer's web site and search for profiles for perforated films or at least a profile for a generic PVC vinyl. Some machines, such as the HP Latex profiles can be accessed or downloaded via the machine's control panel. Refer to the machine's operating instructions.
3. Visit your ink manufacturer's web site and search for profiles for perforated films or at least a profile for a generic PVC vinyl.
4. Visit your RIP software developer's web site and search for profiles for perforated films or at least a profile for a generic PVC vinyl.
5. Should there be no profile matching your criteria, then you have no other option but to create your own. Please refer to our ICC Profile Information Guide for further details about creating a profile. This will be a process of trial and error and therefore may take several hours. Consider the operating environment for the printer and films as well. The equipment and film should be in a temperature and humidity-controlled room. If not, you may need to create a profile for each season of the year, as ambient temperature and humidity can affect the performance of perforated films when printing. This is because perforated vinyls, depending on how it is stored, can be affected by the operating environment. Refer to our Storage and Transportation Fact Sheet for further information.

### *Ink Load Settings*

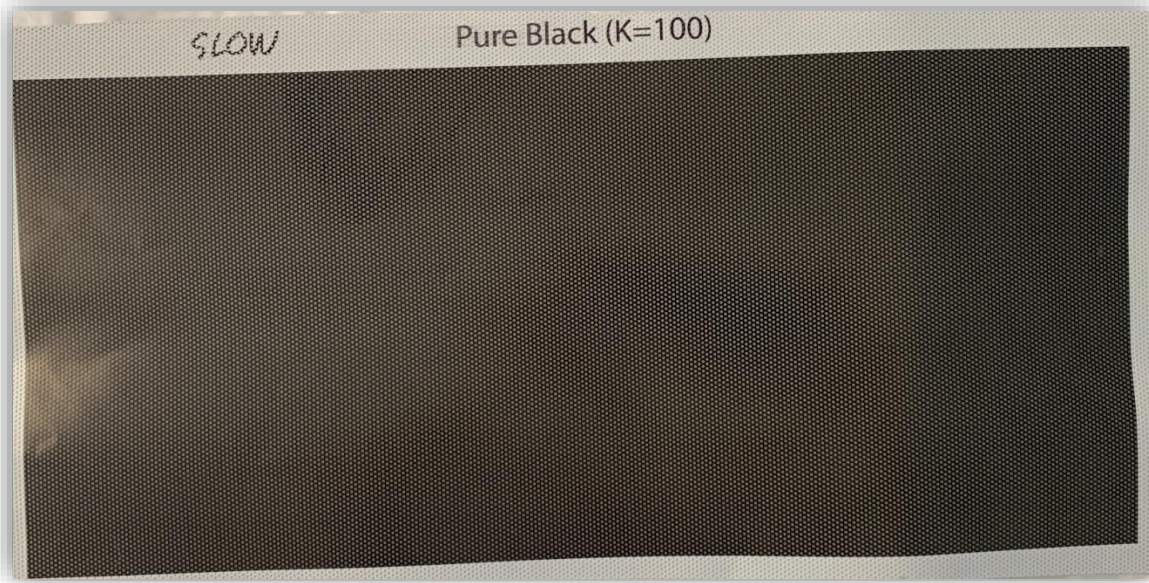
When the correct profile has been selected or created, it is important to adjust the various RIP settings to manage ink load. These settings will include spot colour re-mapping, print head speed and platen (pre/print/post) temperatures. It will come down to finding the correct balance between these three groups of settings, to obtain the appropriate ink load so that the colours printed, match to the customers' expectations and the backing sheet liner is able to absorb the amount of ink dropped into the perforations.

**Printing at a fast speed is a prime reason for ink overload.** Slow the print heads down. But not too slow, as that can cause issues as well. Very high platen temperatures at pre-print, print or post-print will facilitate ink overload. Lower the temperatures, however not too low, otherwise other issues may arise. As to what the exact speed and temperature settings should be, only you can determine that by testing various combinations. We have found for solvent printing, a head speed of 400cm per second and pre/post temperature at 37 degrees Celsius and print temperature at 40 degrees gives a good balance in our production environment.

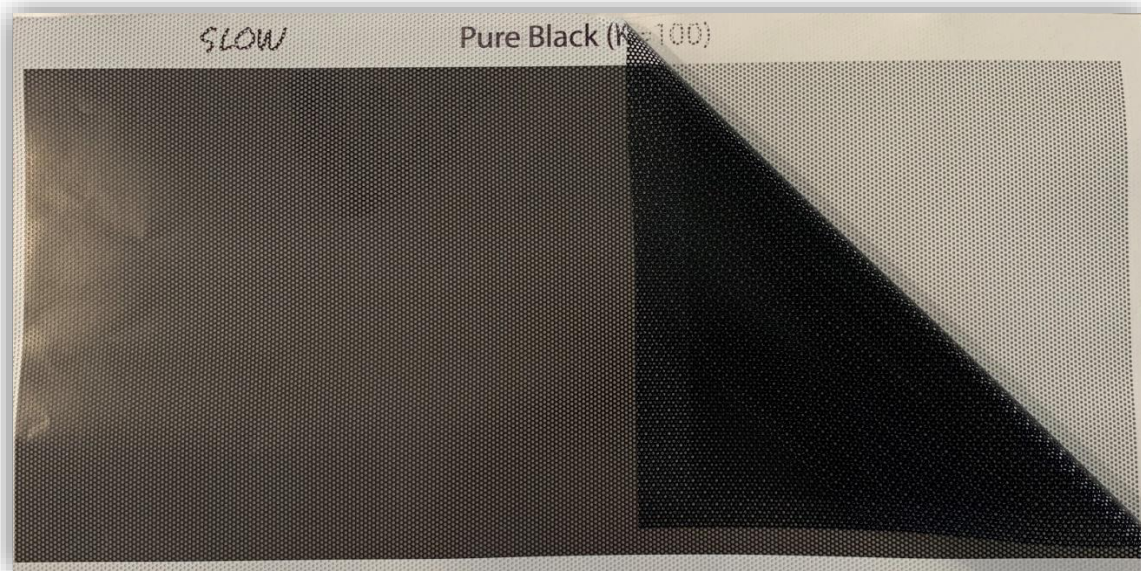
How do you know if the right amount of ink is being laid down? Print a sample then remove the liner. If the ink is bleeding beyond the circles and even merging with other circles, then too much ink has been laid down. Refer to images 1 and 2 above. As there is a double layer of silicone coating on the liner, the ink may coagulate in the exposed perforation areas of the liner, meaning that there is white liner exposed within a circle, but that is a good thing. It may not look pretty, but the liner is doing its job of keeping the ink away from the inner edges of each perforation.

Refer to images 9, 10 and 11. This is a sample of correct ink load. Notice how the ink has not bridged any perforations in image 9. Ink has not bled between perforations in image 10. Ink has not bled through the liner in image 11. How does your sample compare to these photos? If there is bleeding in your sample, then you will need to adjust the speed and/or temperature settings.

**Image 9: Sample of Correct Ink Load - Face Film View**



**Image 10: Sample of Correct Ink Load - Liner View**



**Image 11: Sample of Correct Ink Load - Reverse Liner View**



## Spot Colour Re-Mapping Settings

Many RIP software programs have built in technology to re-map spot colours to CMYK values to match the swatches in the PMS sample books. However, when it comes to dark colours, especially black, this may lead to ink overload. Therefore, it is very important to manually override the remapping in the RIP.

Open the vector artwork (EPS or PDF) in the RIP. Select the dark coloured (such as black) background, as created in Section One. Now follow the steps below to manually re-map, relevant to the RIP being used.

Please note, even though the artwork file may have a value of C=0, M=0, Y=0 and K=100 (or similar), and the RIP may even display output settings the same as these input settings, at the time of “ripping”, the RIP will most likely override the settings, unless otherwise instructed. Hence the need to follow the steps below.

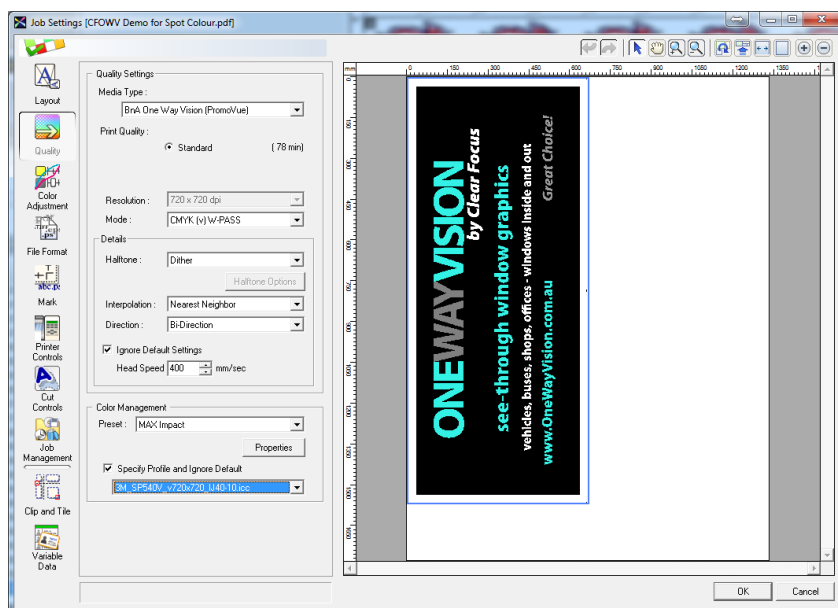
The purpose of these steps is to assign CMYK output values and ensure the RIP is instructed to use only these values and not to override them.

## VersaWorks

Below are the step-by-step instructions to manually map a spot colour in VersaWorks. Please note these instructions are version specific to Version 5. You may need to adjust accordingly to suit the version you have. In this example, we are mapping Spot Black.

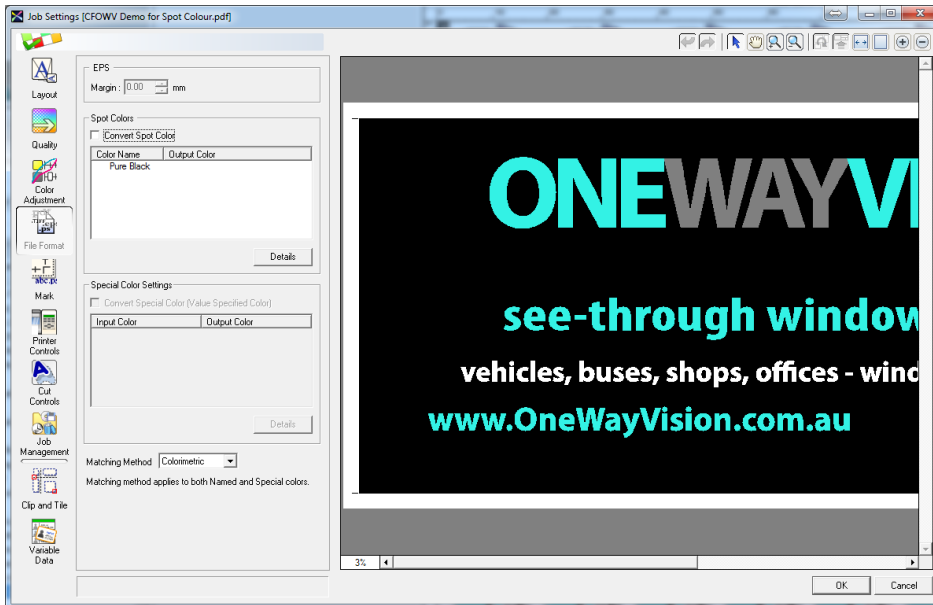
1. Open VersaWorks.
2. Within VersaWorks, open a genuine vectorized PDF/EPS artwork file containing the spot colour to map. This file is usually created in Adobe Illustrator and saved as PDF or EPS.
3. Click the Quality tab.
4. Select the profile you have for One Way Vision in the Media Type drop down field.
5. Tick the Ignore Default Settings checkbox field to enable Head Speed. Change head speed to 400mm/sec.
6. Select MAX Impact under Color Management in the Preset drop down field.
7. Tick the Specify Profile and Ignore default check box field and select the relevant 3M IJ40-10 value for your Roland printer.
8. Refer to image 12 below.

Image 12: Screen shot - VersaWorks - Quality Tab Recommended Settings



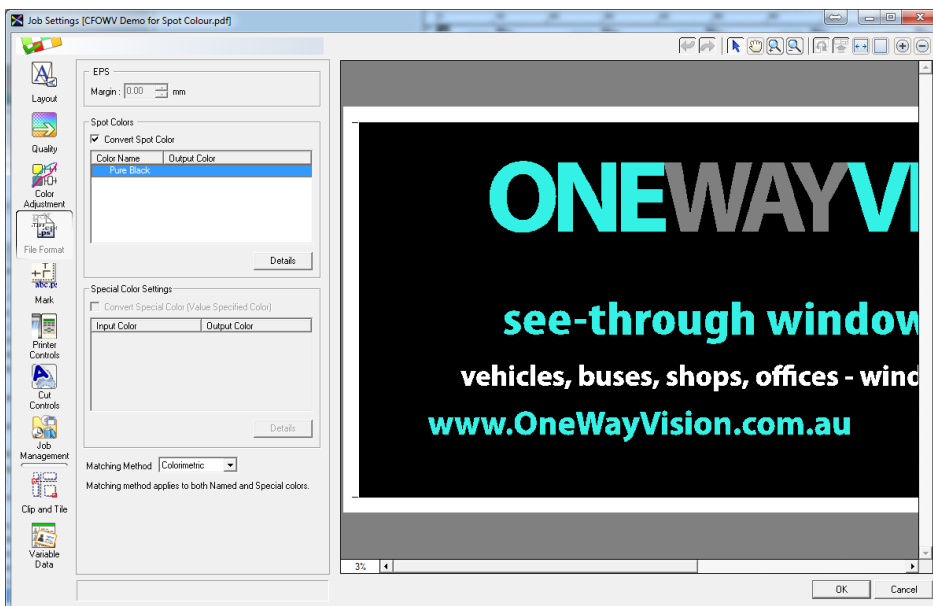
9. Click the File Format tab. Refer to image 13 below.

**Image 13: Screenshot - VersaWorks - File Format Tab Recommended Settings**



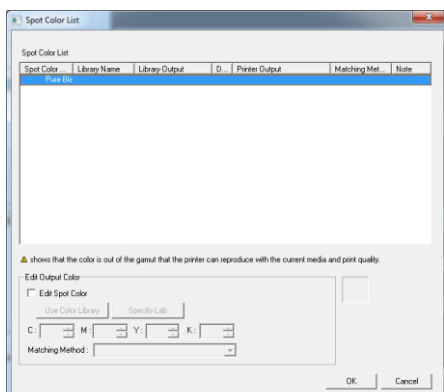
10. Tick the Convert Spot Color checkbox field. Refer to Image 14 below.

**Image 14: Screenshot - VersaWorks - Convert Spot Colour**



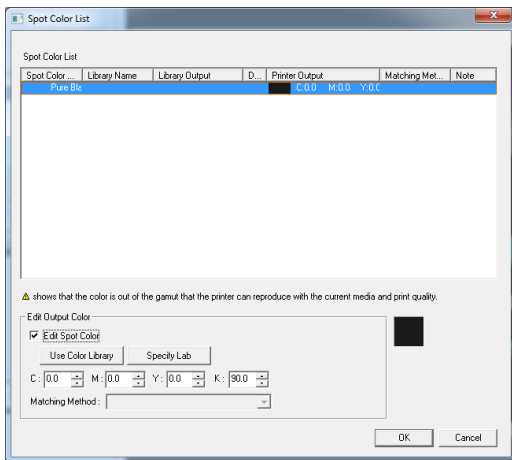
11. Tick the Details button. Refer to Image 15 below.

**Image 15: Screenshot - VersaWorks - Spot Color List Popup Window**



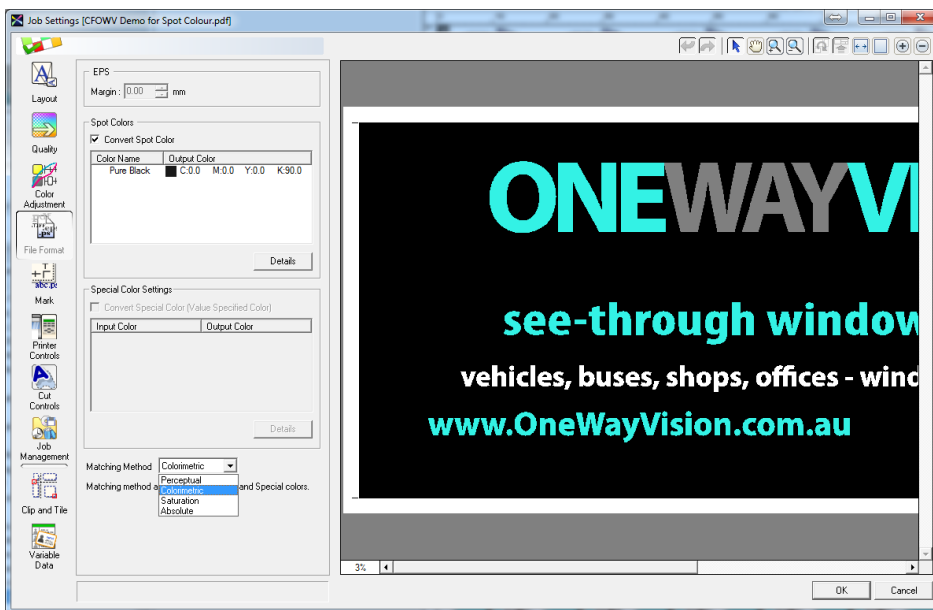
12. Select the spot colour you want to manually re-map. In this example, it is Pure Black.
13. Click Edit Spot Color checkbox field. Enter the desired CMYK values you want for this spot colour. Ensure the total of the CMYK values does not exceed 200. In this example, we are remapping spot black to be C=0, M=0, Y=0 and K=90. Refer to Image 16 below.

**Image 16: Screenshot - VersaWorks - Remapping CMYK for Spot Colour**



14. Click OK button.
15. Select Colorimetric from the Matching Method dropdown field. Refer to Image 17 below.

**Image 17: Screenshot - VersaWorks - Job Settings**



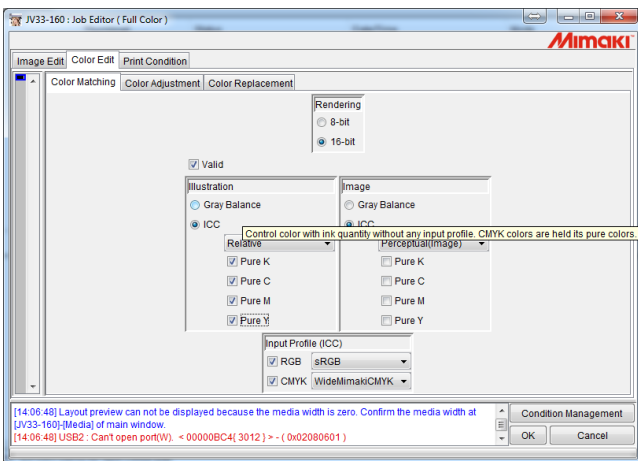
16. Click OK button.
17. Click the RIP and PRINT button. After the job has been printed, confirm that an appropriate ink load has been laid down by removing a small portion of the backing sheet liner and checking that the ink has not bled between the perforations or completely through liner to the other side. If it has, then double check the settings and adjust accordingly. RIP and PRINT again. Keep adjusting the settings until there is no more ink overload.

## RasterLink

Below are the step-by-step instructions to manually map a Spot colour in RasterLink. Please note these instructions are version specific. You may need to adjust accordingly to suit the version you have. In this example, we are mapping Spot Black.

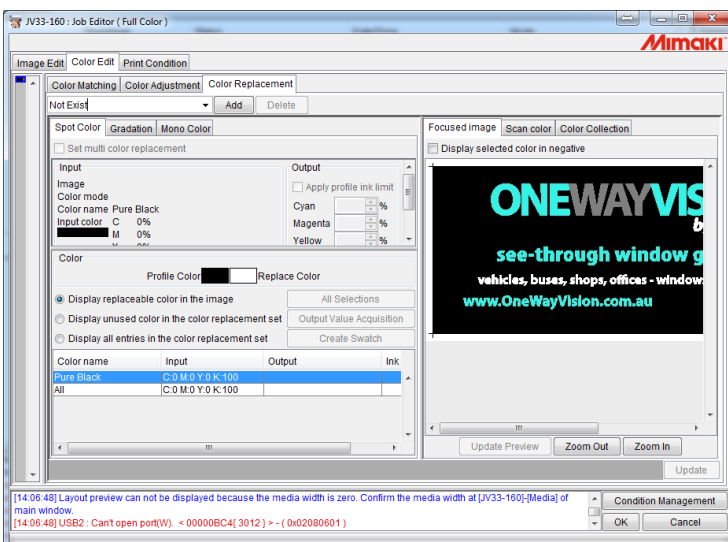
1. Open RasterLink.
2. Within RasterLink, open a genuine vectorized PDF/EPS artwork file containing the spot colour to map. This file is usually created in Adobe Illustrator and saved as PDF or EPS.
3. Click the Job Editor button.
4. Select the Color Edit tab. Select the Color Matching sub-tab.
5. Tick the Valid checkbox field.
6. Select ICC option under the Illustration column heading. Select Relative in the drop-down field.
7. Tick Pure K, Pure C, Pure M and Pure Y checkbox fields.
8. Select ICC option under the Image column heading. Select Perceptual (Image) in the drop-down field.
9. Untick Pure K, Pure C, Pure M and Pure Y checkbox fields.
10. Refer to image 18 below.

Image 18: Screenshot - RasterLink - Job Editor Recommended Settings



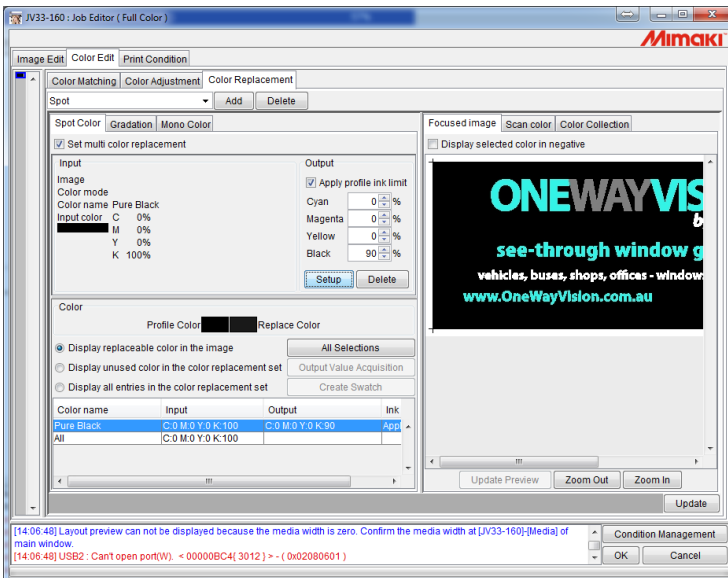
11. Select the Color Replacement tab.
12. Enter a name in the Preset field. In this example, we named it Not Exist. Then click Add button. You may wish to call it Spot Black Remap instead.
13. Select the Spot Color tab. Select the spot colour you wish to remap. In this example, it is Pure Black.
14. Refer to image 19 below.

Image 19: Screenshot - RasterLink - Spot Colour Remapping



15. Click on the spot colour in the image displayed on the right side of the screen under Focused Image. In this example, black was clicked on.
16. Tick the Set multi color replacement checkbox field.
17. Tick the Apply profile ink limit checkbox field under Output.
18. Enter the desired CMYK values you want for this spot colour. Ensure the total of the CMYK values does not exceed 200. In this example, we are remapping spot black to be C=0, M=0, Y=0 and K=90. Refer to Image 20 below.
19. Click Setup button. The output CMYK values will now display in column next to the Input CMYK values.
18. Click OK button. RIP and PRINT (right mouse button click on job name). After the job has been printed, confirm that an appropriate ink load has been laid down by removing a small portion of the backing sheet liner and checking that the ink has not bled between the perforations or completely through liner to the other side. If it has, then double check the settings and adjust accordingly. RIP and PRINT again. Keep adjusting the settings until there is no more ink overload.

**Image 20: Screenshot - RasterLink - Spot Colour Recommended Settings**

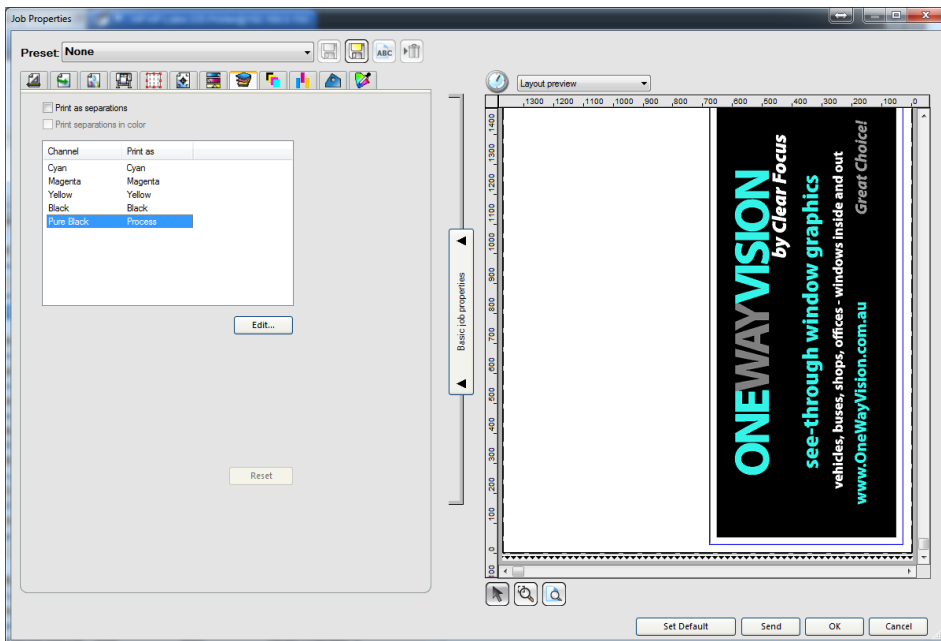


### **FlexiPrint**

Below are the step-by-step instructions to manually map a Spot colour in FlexiPrint. Please note these instructions are version specific. You may need to adjust accordingly to suit the version you have. In this example, we are mapping Spot Black.

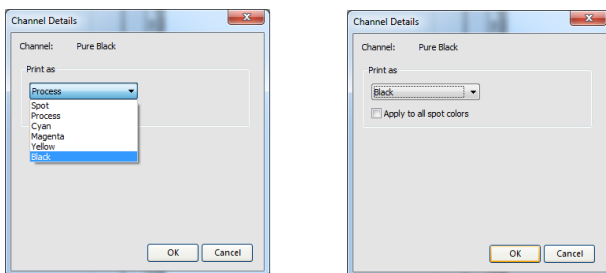
1. Open FlexiPrint Production Manager.
2. Within FlexiPrint, open a genuine vectorized PDF/EPS artwork file containing the spot colour to map. This file is usually created in Adobe Illustrator and saved as PDF or EPS.
3. Double click on the job name to open the Job Properties window.
4. Select the Separation tab. Select the spot colour you want to remap. In this example it is called Pure Black.
5. Click the Edit button.
6. Refer to image 21 below.

Image 21: Screenshot - FlexiPrint - Job Properties



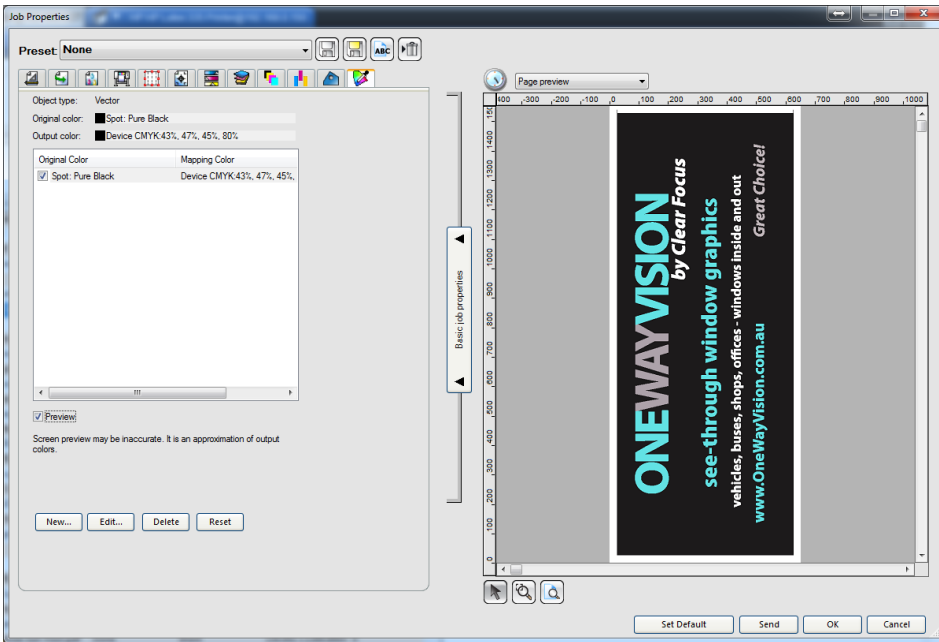
7. The Channel Details popup window is displayed. Click on the Print As dropdown field and select the channel to change. In this example, it is Black. Click OK button.
8. Refer to image 22 below.

Images 22: Screenshot - FlexiPrint - Channel Details



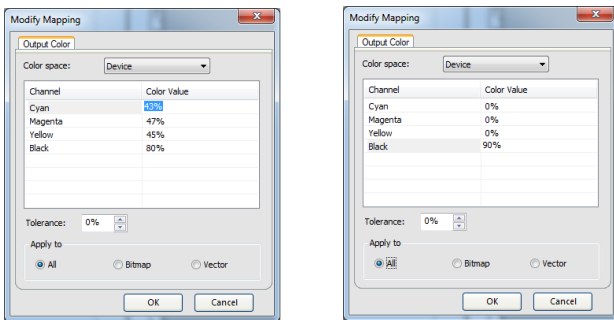
9. Select the Object Color Control tab.
10. Click on the spot colour in the image displayed on the right side of the screen under Page preview. In this example, black was clicked on.
11. Tick the spot colour to remap from the list displayed in the Original Color column. In this example, it is Spot: Pure Black. Notice the CMYK values under the Mapping Colour column. Even though in the artwork, the CMYK values are different, FlexiPrint has reassigned artwork file values to different numbers.
12. Refer to image 23 below.

Image 23: Screenshot - FlexiPrint - Object Color Control



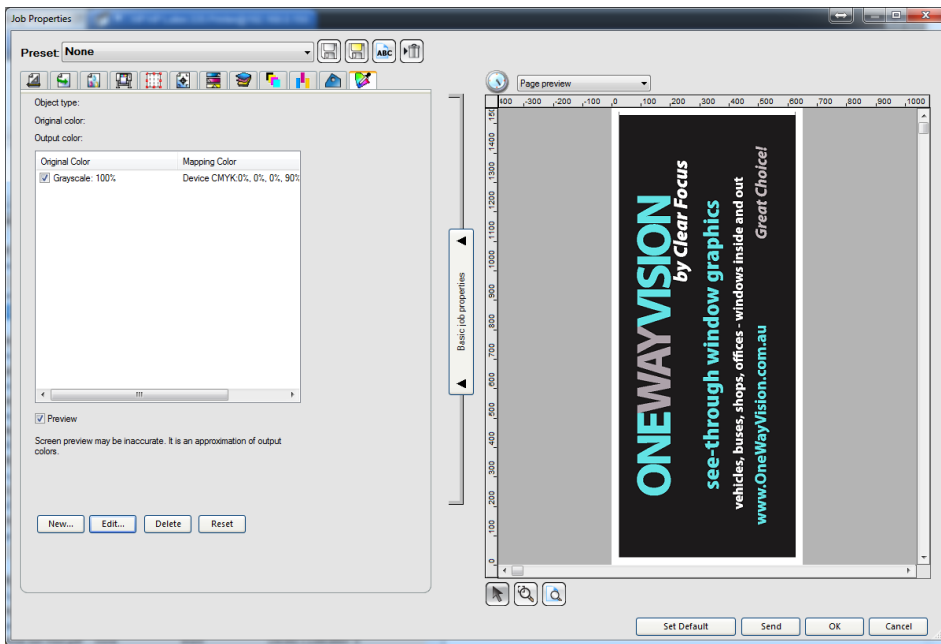
- Click the Edit button. For each of the channels, enter the colour value you want for this spot colour. Ensure the total of the CMYK values does not exceed 200. In this example, we are remapping spot black to be C=0, M=0, Y=0 and K=90. Click OK button. Refer to image 24 below.

Image 24: Screenshot - FlexiPrint - Modify Mapping



- Check the mapping color CMYK values have been remapped. Refer to image 25 below.
- Click OK button. RIP and PRINT (right mouse button click on job name). After the job has been printed, confirm that an appropriate ink load has been laid down by removing a small portion of the backing sheet liner and checking that the ink has not bled between the perforations or completely through liner to the other side. If it has, then double check the settings and adjust accordingly. RIP and PRINT again. Keep adjusting the settings until there is no more ink overload.

Image 25: Screenshot - FlexiPrint - Job Properties



### 3. Post-Production

Lastly, various post-production tasks may cause perforated vinyl to curl in the corners or lift along the edges. Such as:

- Incorrect way of outgassing
- Insufficient duration for outgassing
- Laminating with a laminate that is not the matching laminate as recommended by us
- Incorrect way of laminating
- Laminator machine not calibrated or out of alignment
- Incorrect way of transporting the media to job site
- Insufficient duration after laminating before application to a window
- Incorrect way of cleaning a window
- Not using our recommended cleaning product
- Incorrect time of day when applying to a window

All the above points are explained in various documents located on our website: [www.onewayvision.com.au](http://www.onewayvision.com.au), such as:

- General Instructions
- Storing, Printing, Drying and Transporting Information Sheet
- Laminating Instructions
- Transport and Surface Preparation Information Sheet
- Install Instructions for Buildings
- Install Instructions for Vehicles

To ensure a successful One Way Vision project, please download, read and follow the instructions in these documents.

## Summary

In summary, to minimise the risk of perforated vinyl curling or lifting after application to a window, the following is recommended.

1. Do not use a single dark colour as the predominant colour for the background. Preferably use white or light-coloured background.
2. Use vector-based artwork design software, such as Adobe Illustrator.
3. Use spot colour for the background colour.
4. Do not exceed 200% for CMYK combined value.
5. Manually re-map the spot colour in the RIP to a CMYK total value of no more than 200%.
6. Follow the step-by-step instructions as prescribed in the documents listed above.