
INSTRUCTION MANUAL

SOFTWARE

PREPRESS AND WORKFLOW

DUSENSE SENSORY COATER

DDC-810

Be sure to read this manual prior to use.
Please leave this manual at the site of use for easy reference

Introduction

Thank you for purchasing a Duplo product.

This manual is intended for the use of persons preparing artwork and managing the flow of jobs to the DuSense Sensory Coater

Be sure to read this manual prior to using the product.

After reading, leave the manual at the site of use for easy reference whenever questions related to the product arise in the future.

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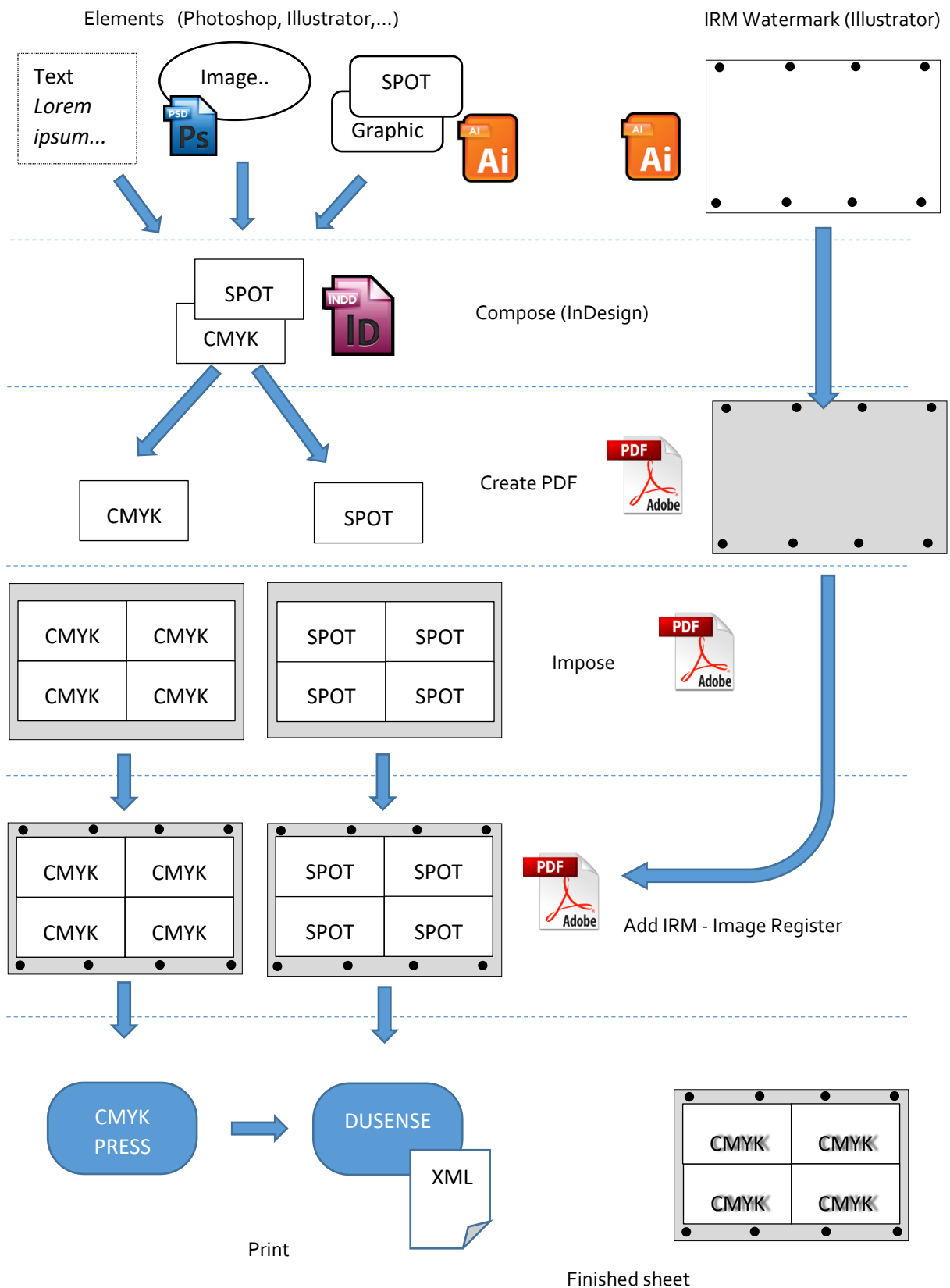
1. Workflow Overview

The wide range of workflow systems, means that possible workflows and the features they possess is very broad and constantly changing. The processes described in this manual are generalised, showing one possible sequence and the principles described can often be adapted or implemented using an alternative process. The main stages of workflow are described using common software programmes from the Adobe Creative Suite.

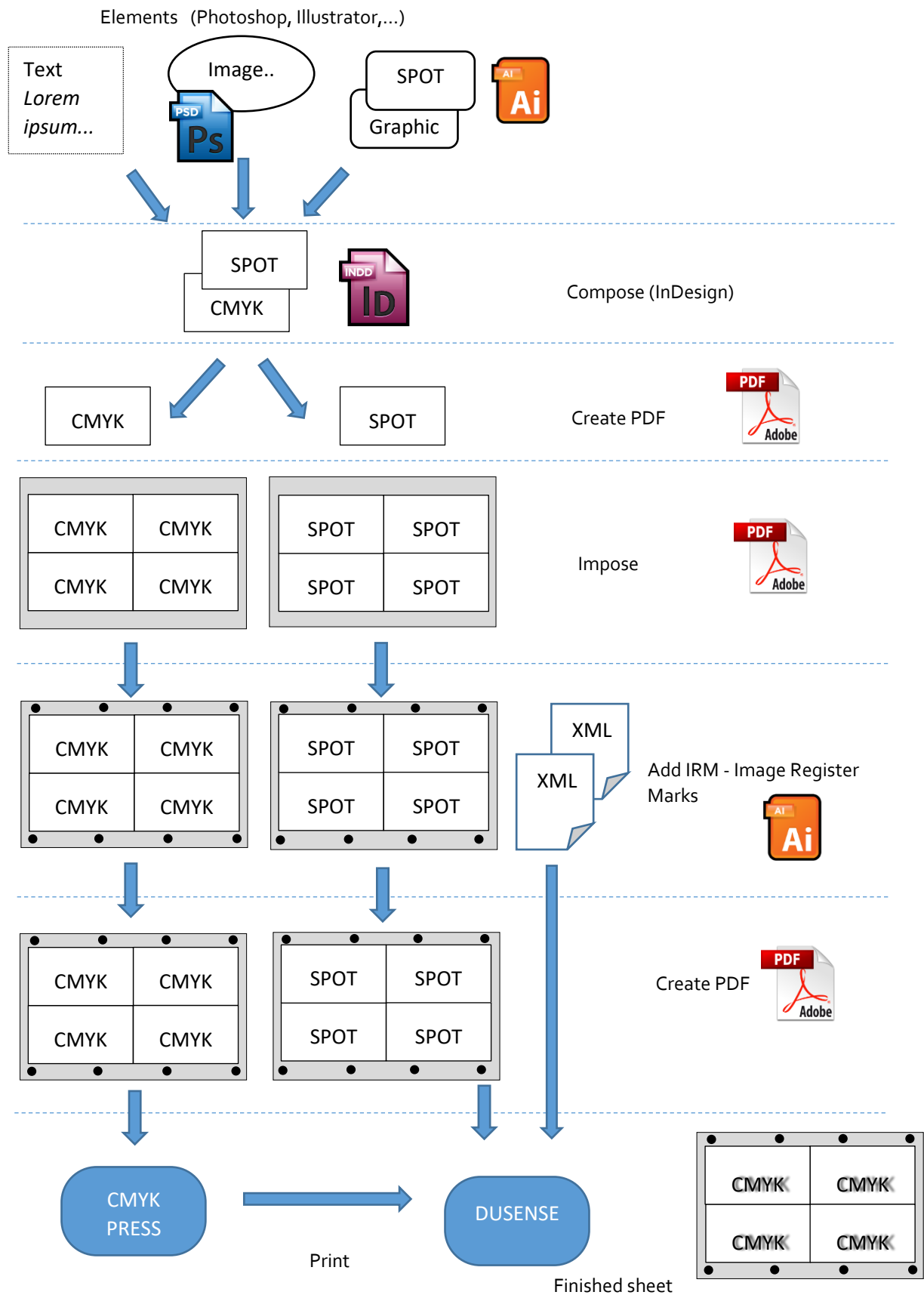
Workflow A is the recommended process, because:

1. The addition of the IRM as a PDF watermark can be included as an automated process, reducing the number of steps. With Workflow B it is not possible to include the addition of the IRM as an automated stage, interfering with existing automated workflows and hot folder processes.
2. Multiple watermarks can be pre-created and optimised for different finishing workflows. For example;
 - (i) Including the REGISTER mark required for the DC-616/646/746 model cutters. In Workflow B, this mark will need to be recreated every time, for both SPOT and CMYK files, increasing the chance of one being different to the other.
 - (ii) Optimised for different presses, taking account of the different borders and unprintable margins
 - (iii) Precreated so that the pre-press operator can choose from a library, instead of having to make the same creative choices each time (as required for Workflow B)
3. It avoids possible problems created by importing a PDF into Illustrator, then resaving as a PDF (as required in Workflow B)

1. Workflow A (Recommended)



2. Workflow B (Alternative)

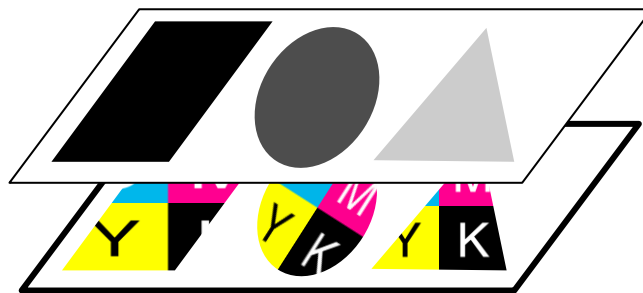


2. Design Intent

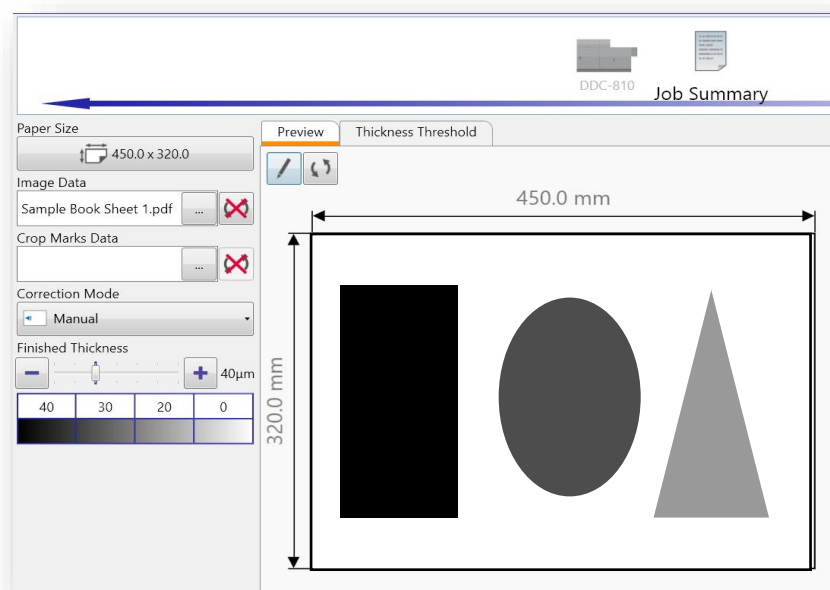
3. Creation of Main Artwork – Illustrator

The Duplo DDC-810 can produce a layer of coating of one single thickness, or a range of thickness upon the same sheet. It does this through the use of grayscale levels where BLACK is the maximum thickness and greys (represented as a transparency) are lesser thicknesses.

Using design applications such as Adobe Illustrator, create a fifth layer for the spot UV coating. The colour 100% Magenta is typically chosen for this layer, but it should be exported as a separate PDF layer for the coater where a greyscale value of 100% is black (not 100% magenta which is ~50% black). The press will interpret the darkness of the element as the required thickness, i.e. a black element will print with a thick layer of coating, a pale grey will print with a thin layer of coating.



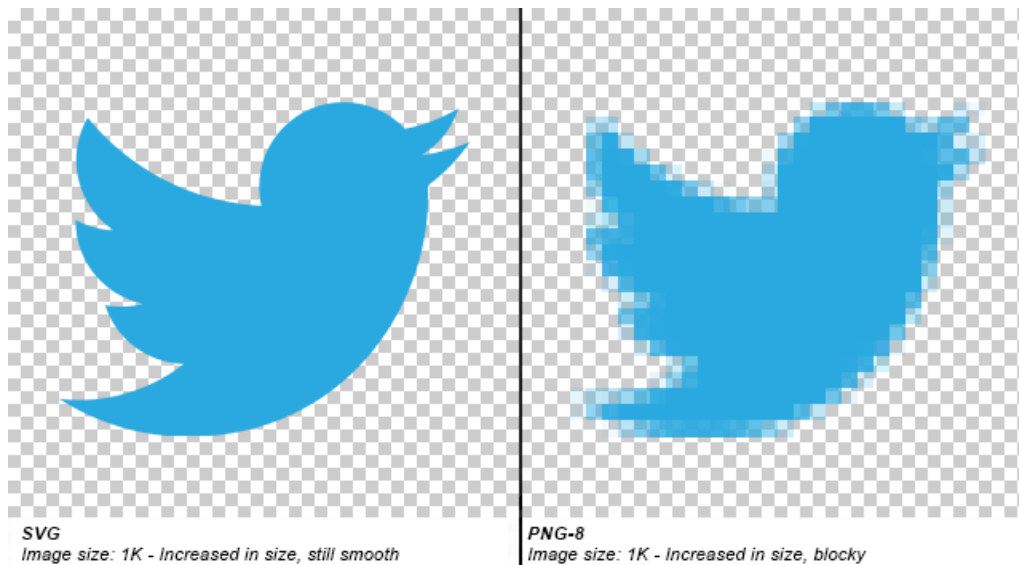
Operator's view of job



Where possible, use Vector images such as .eps format.

Image format ssuch as TIFF, BMP and JPEG are not vector images and have a pixellated construction.

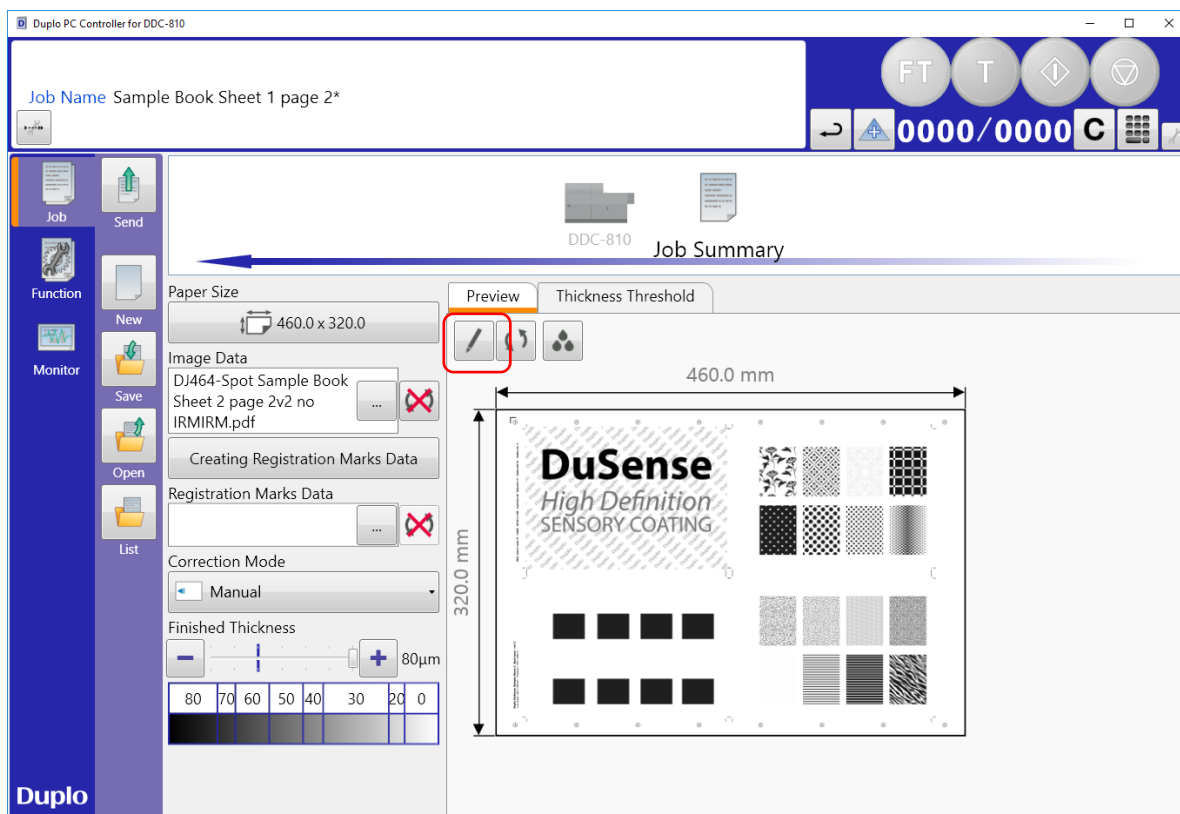
Images and text can be “outlined” in Illustrator to create a smooth outline.



4. Prepress uses for DuSense Operator GUI

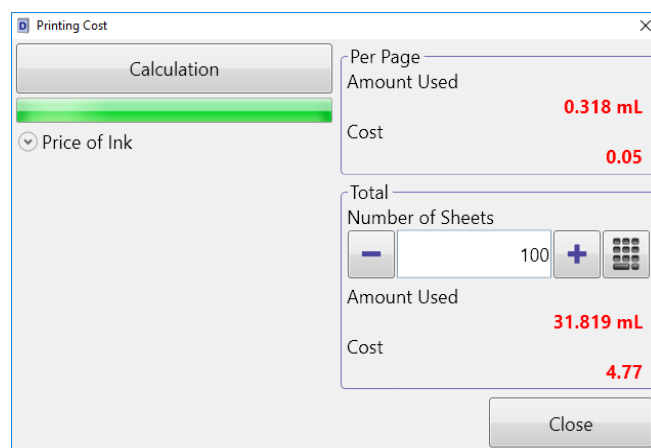
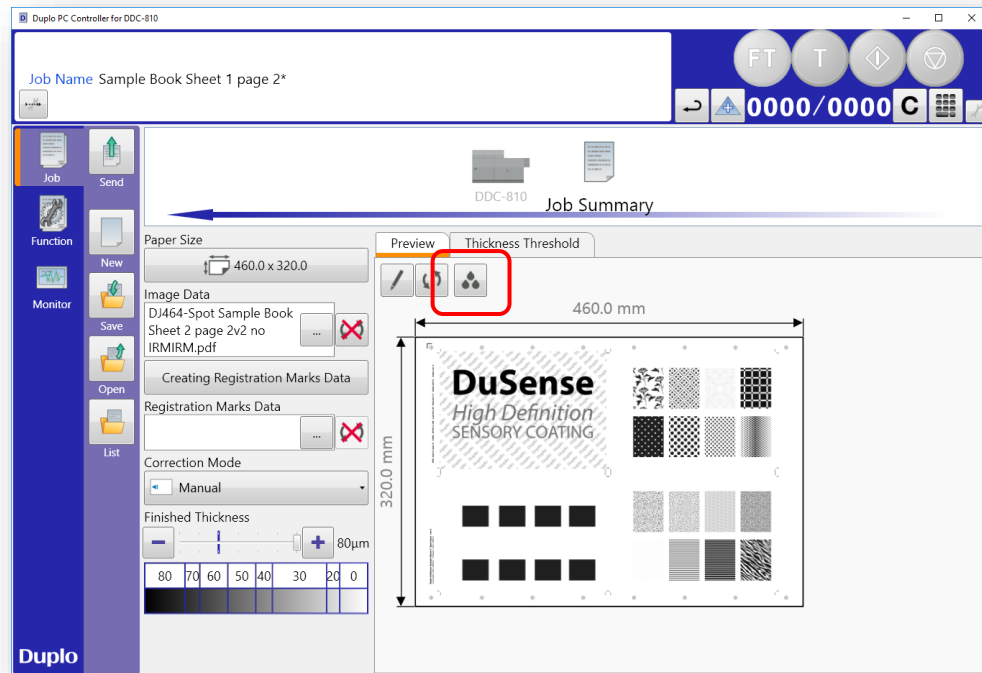
The PC Controller is not licensed, allowing it to be installed on a Windows PC in the pre-press area where jobs are being created.

The same application can be used to estimate costs for the job by analysing the imported artwork. A PDF or TIFF can be imported and checked before submitting to the Duplo coater. As the sliding scale for "Finished Thickness" is moved, the value for the maximum thickness changes and the threshold value for other levels is automatically recalculated.



5. Job Costing

The quantity and cost of Sensory Coating can be calculated using the integrated tool in the GUI. This analyses the PDF and the coating thickness that has been selected. Modifications to operator settings are interactive and reflected in the calculations.



6. Consideration of Finishing Requirements

Refer to Section 7 "Finishing"

Generally :

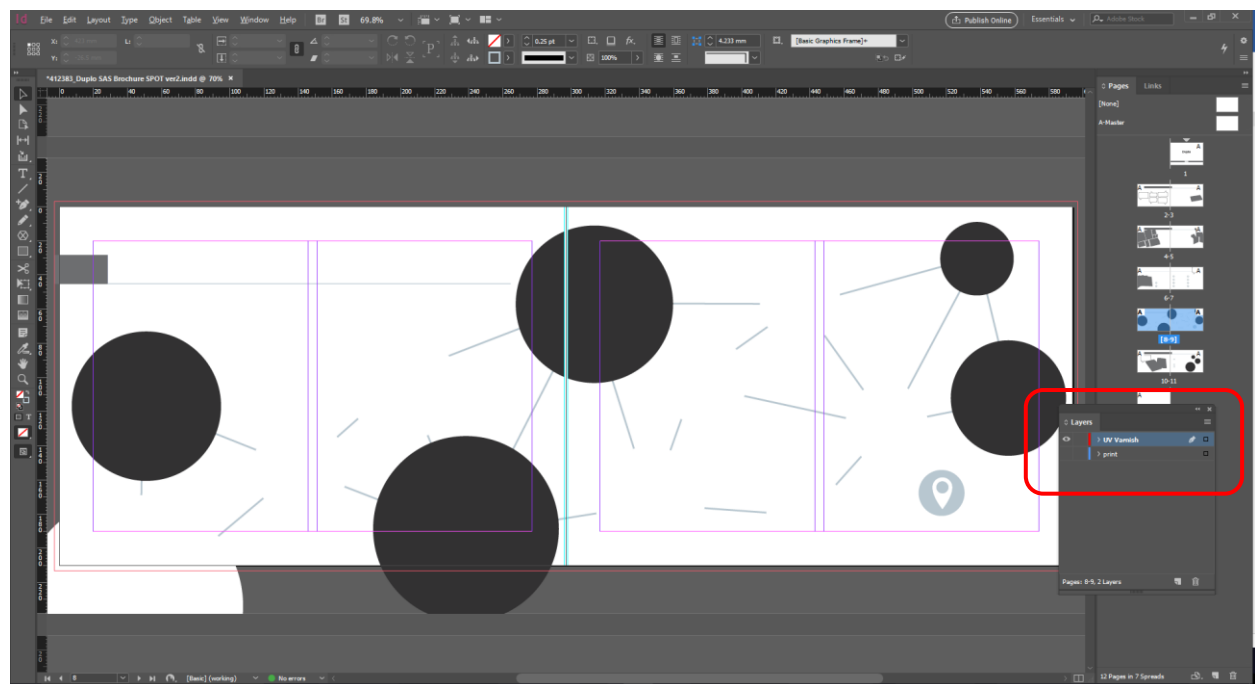
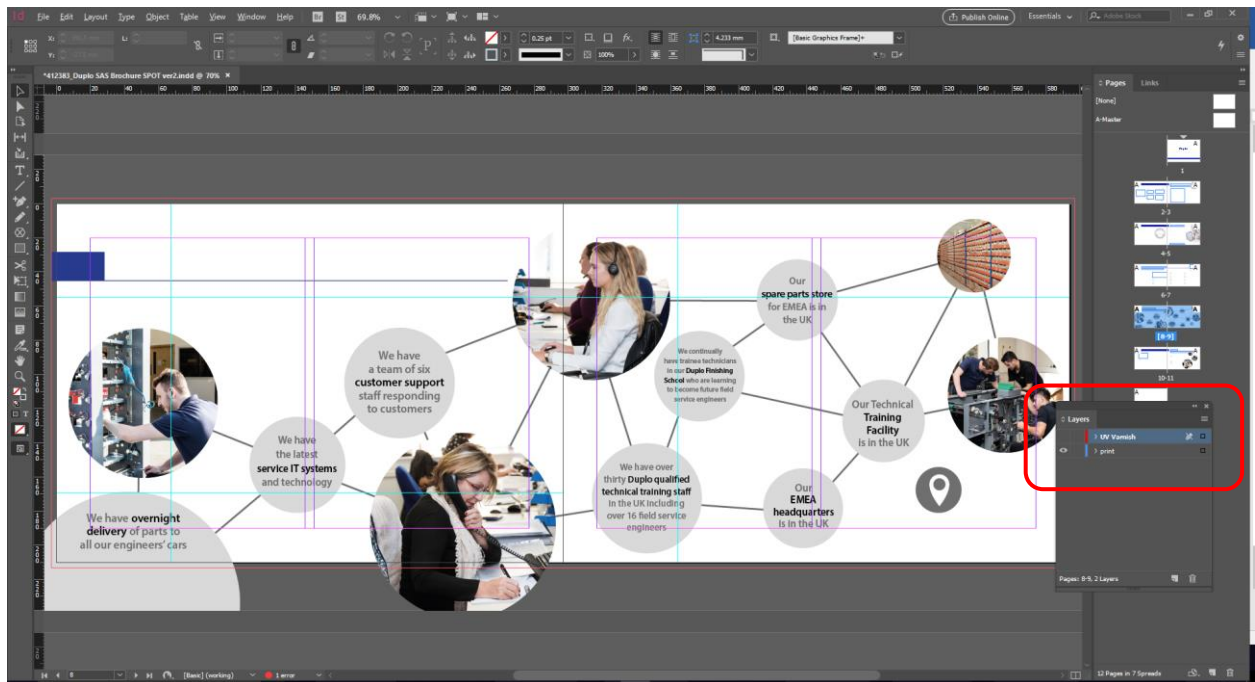
Do not apply coating to within 3mm of cutting or folding. Exceptions can be made when

- (a) Cutting on a sheet cutter such as Duplo DC-616 / 646 or 746
- (b) Laminating and then using a matrix creasing rule

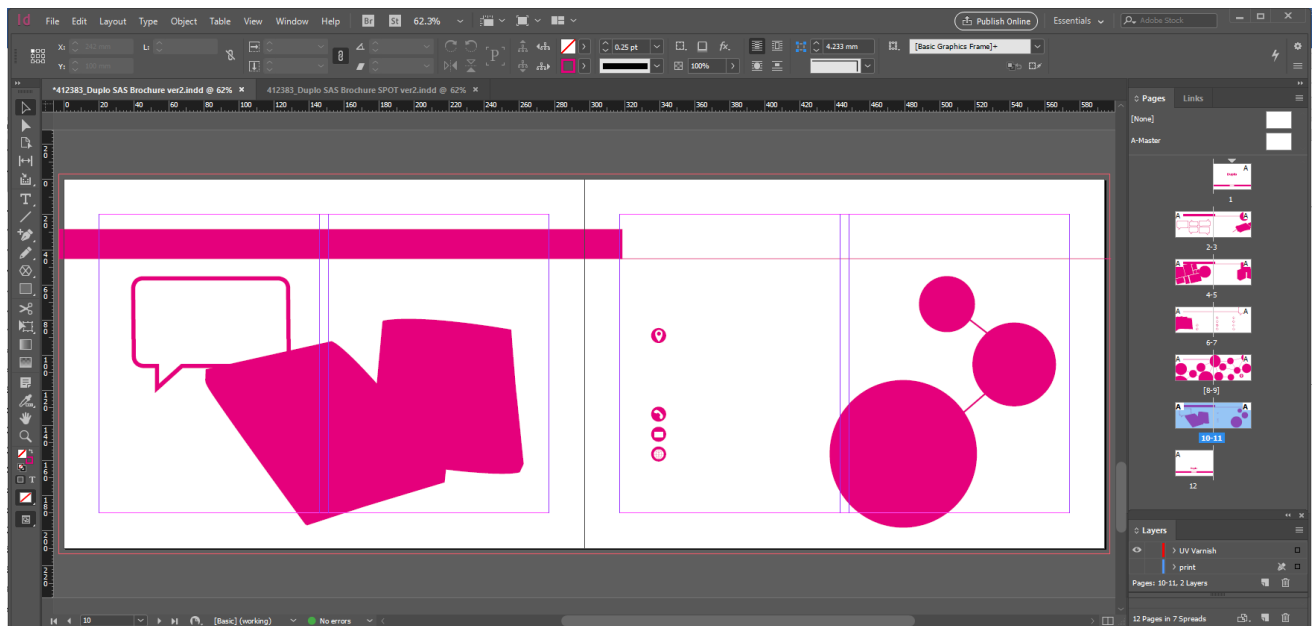
Problems increase when the coating is a thick layer (>40 micron) as it will tend to delaminate and tear away from the media.

7. Page Layout - InDesign

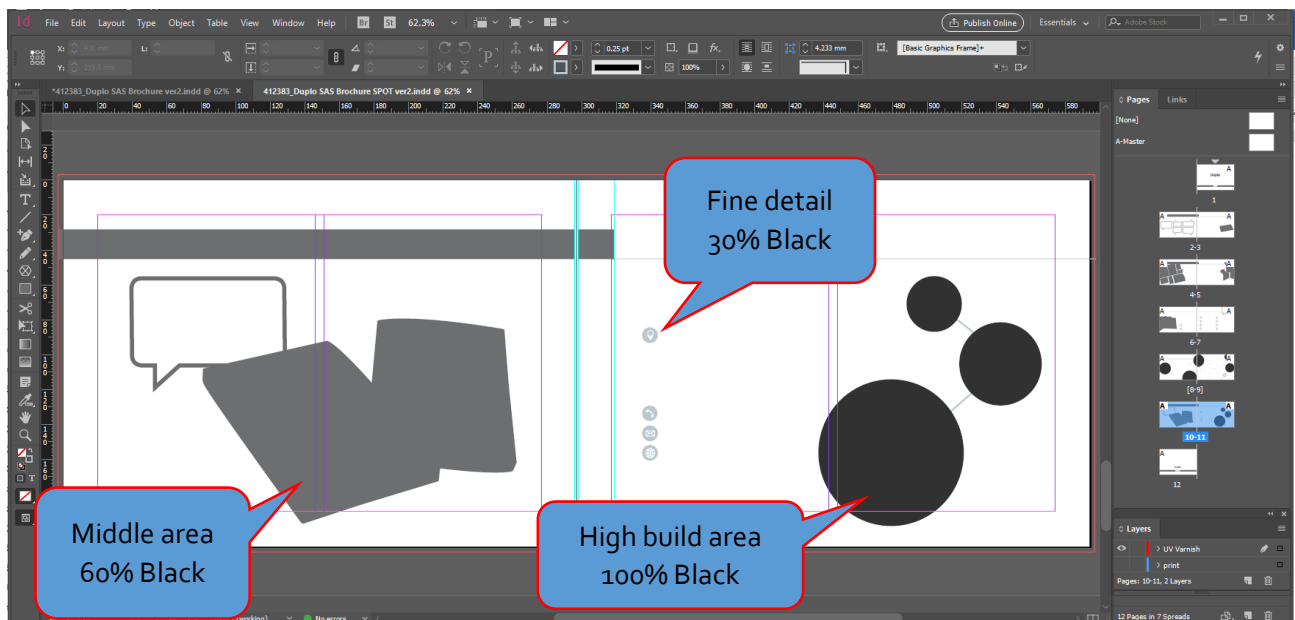
It is assumed that the Spot Layer will be created in Illustrator, and InDesign used for page layout. However; it is quite possible that Spot detail will be added for elements such as text in the page layout application. Maintain the layers, with the CMYK layer separate to the SPOT layer for the DuSense.



NOT CORRECT! - Conventional SPOT UV layer created in 100% Magenta



CORRECT - SPOT UV layer created in spot colour, but convert to black before exporting to PDF. (If PDF is already Magenta, open PDF in Illustrator, convert Magenta to Black, resave as PDF)



3. File Preparation

8. Restrictions for DuSense

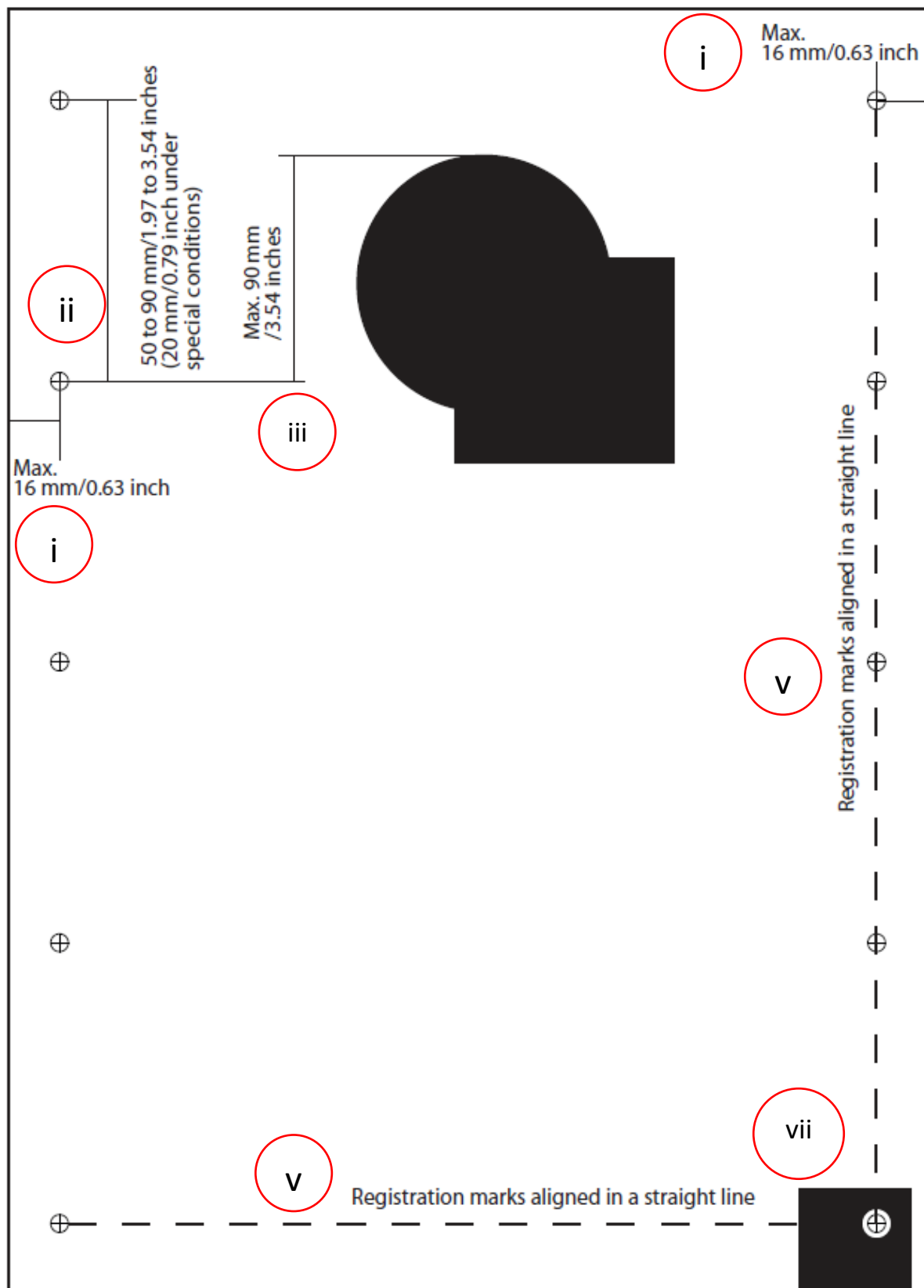
To ensure accurate registration, the CMYK sheet needs marks that can be recognised by the camera system. The allowable positions are shown in the Instruction Manual and reproduced on the following page.

It is very important to follow the restrictions and guide lines.

- (i) The mark is within 16 mm/0.63 inch from the edge of the paper.
- (ii) The distance between each registration mark is 50 to 90 mm/1.97 to 3.54 inches.
- (iii) The second pair of registration marks is within 90 mm/3.54 inches from the beginning of the image.
- (iv) The registration marks are a cross shape. The line width is about 0.176 mm (0.5 pt) and the length is 4 mm (11.34 pt). 1 pt is equal to 72 dpi. The diameter of the circle must be between 3.8 and 4.2mm.
- (v) The maximum number of registration marks is 20 pairs.
- (vi) The distance from the edge of paper is the same for each pair and the pair is arranged on the same line.
- (vii) If there is an image on a mark, 1 mm/0.04 inch or more from the outer circumference must be a reverse type (outline characters on a colored background).

Information on Image Register Marks (IRM)

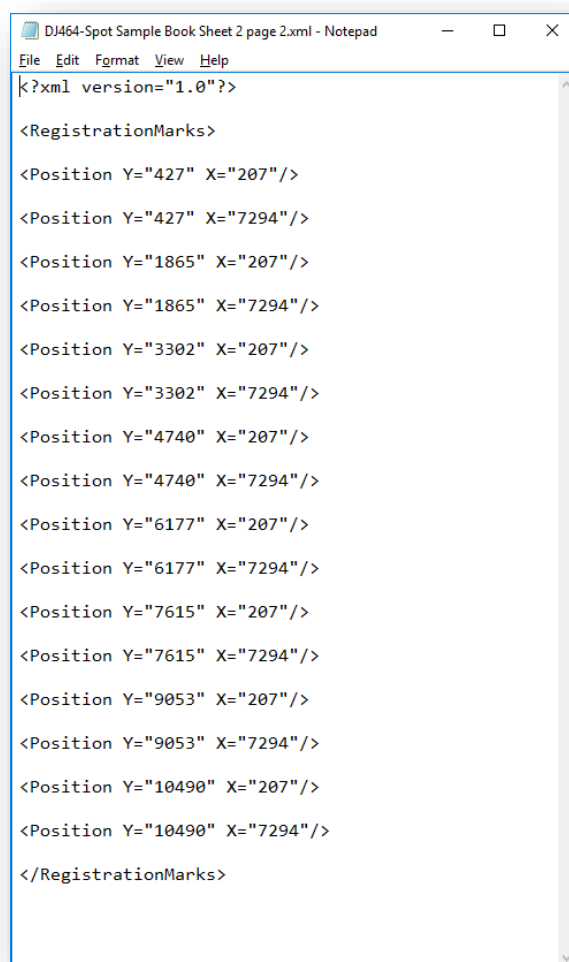
This version from Instruction Manual version 16K-90031-0 of May 2017



Notes related to XML file

- (i) Convert the registration mark of X and Y positions (X=position from the left edge of paper, Y=position from the lead edge of paper) to 600 dpi using the following calculation formula:
- (ii) $\text{Position (mm)} \times 600/25.4$
- (iii) When the distance between a registration mark and the next one exceeds 90 mm/3.54 inches, you can shorten the distance between the next registration mark and the one after the next up to 20 mm/0.79 inch.

Sample XML file



```
<?xml version="1.0"?>

<RegistrationMarks>

<Position Y="427" X="207"/>
<Position Y="427" X="7294"/>
<Position Y="1865" X="207"/>
<Position Y="1865" X="7294"/>
<Position Y="3302" X="207"/>
<Position Y="3302" X="7294"/>
<Position Y="4740" X="207"/>
<Position Y="4740" X="7294"/>
<Position Y="6177" X="207"/>
<Position Y="6177" X="7294"/>
<Position Y="7615" X="207"/>
<Position Y="7615" X="7294"/>
<Position Y="9053" X="207"/>
<Position Y="9053" X="7294"/>
<Position Y="10490" X="207"/>
<Position Y="10490" X="7294"/>

</RegistrationMarks>
```

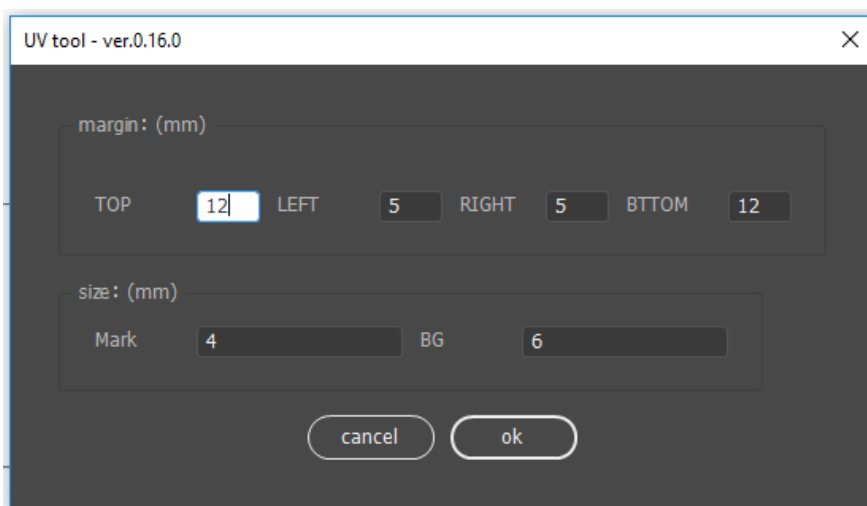

9. Creation of Registration Marks - Illustrator

To create these marks automatically Duplo provides a plug-in for Illustrator [Uvtool16.jsx]. This is located in:

C:\Program Files\Adobe\Adobe Illustrator CC 2017\Presets\en_GB\Scripts

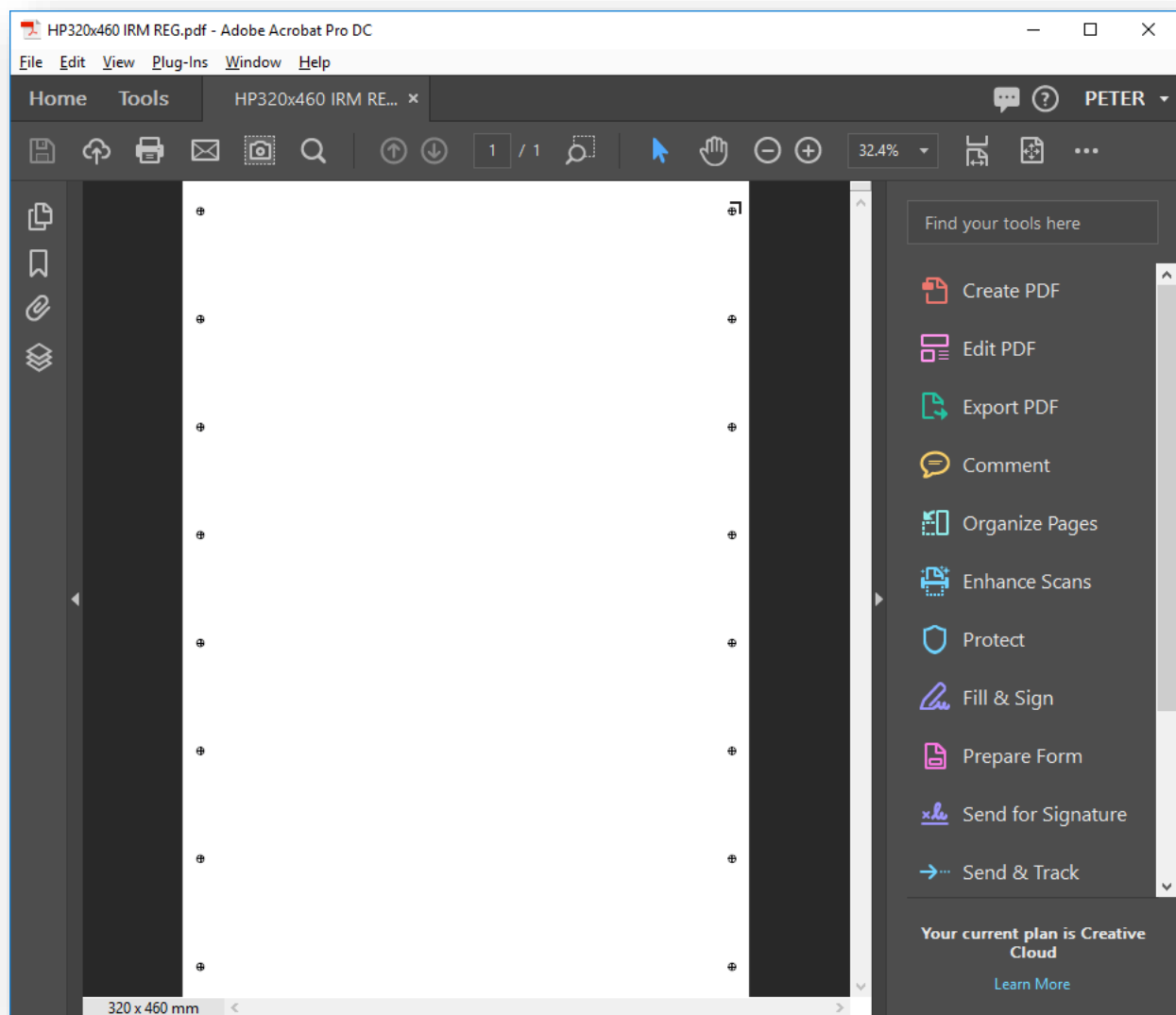
With the artwork open in Illustrator, select [File / Scripts / UVTool10]. The app opens and asks for location of the corner marks and size.

- The default location is 4mm from each edge. This is not to the centre of the mark but the border. For HP Indigo you need typically 12mm top and bottom of a portrait sheet (to allow for the 10mm gripper fingers on the Indigo), and say 5mm for the unprintable margin on the long sides.
- Accept 4mm as the size of mark, this is the outside diameter
- BG is the size of white space around the registration mark to ensure it is clear and separate from the background. Default is 6 which creates a 1mm clear zone around the target.



As the marks are applied, an XML file is created in the same location. The data in this file gives the XY coordinates of all these marks.

This is the watermark created using the Duplo .jsx plug-in tool in Illustrator.



This version is for 320x460 format paper and includes the L shaped register mark used by the Duplo sheet cutters DC-616/646/746 models.

Similarly, you can create more watermark files to suit other common sheet sizes, 320x464, 320x450, etc.

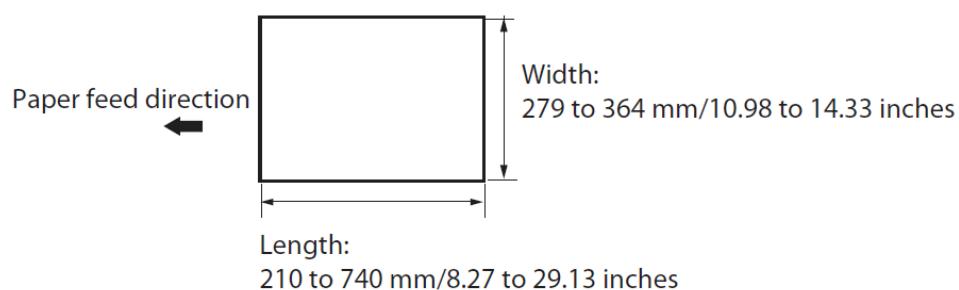
4. Imposition

10. Considerations for Sheet Layout

Paper sizes that can be run in the DuSense

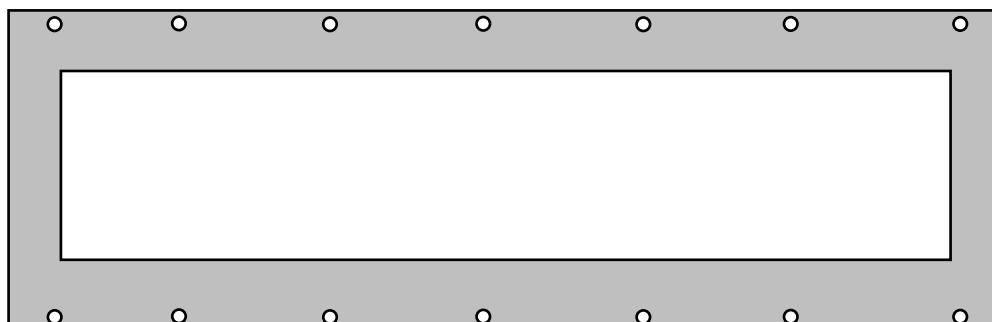
Width 279 to 364 mm

Length 210 to 740 mm



NOTE ! Take note that the minimum width is 279mm. This is US Letter size which is approximately A4. For this size of sheet you can run long edge leading which is very efficient.

But, should you wish to print a narrow sheet such as for an A4 landscape format booklet cover, the trimmed sheet is probably 230mm x 630mm, for example. This cannot be run long edge leading, and the width is less than 279mm. Leave the trimmed size >279mm and also lay down the IRM according to this trimmed size, not to the 210mm width, like so :



The maximum print width of the Duplo press is 330mm. However; a border of 10mm around all 4 sides is unprintable.

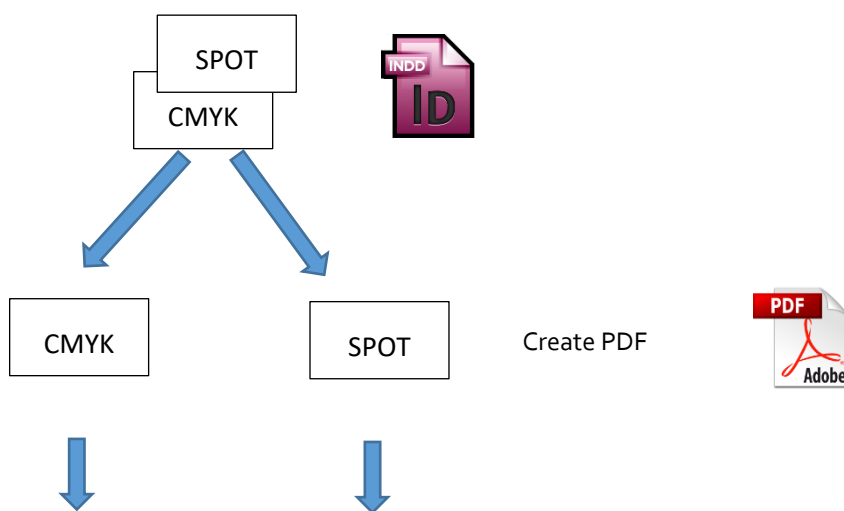


Caution : it is possible that at the imposition stage there are features such as crop marks, fold lines, colour bars, slug lines on the sheet. These and the artwork image cannot conflict with the registration marks. To avoid confusing the cameras there should be at least 1mm quiet zone around the mark. Choose the appropriate settings in the Illustrator plug-in, and ensure these IRM are ON TOP of the image.

A new template may need creating that generates marks that do not conflict.

11. Separation of Layers - Acrobat

The Duplo can absorb a PDF or TIFF but there is no way to select which layer to print, it is treated as a single file. The most common format is expected to be PDF, in which case the file should be split into one file for the colour press and the Spot UV layer into a separate file for the Duplo.



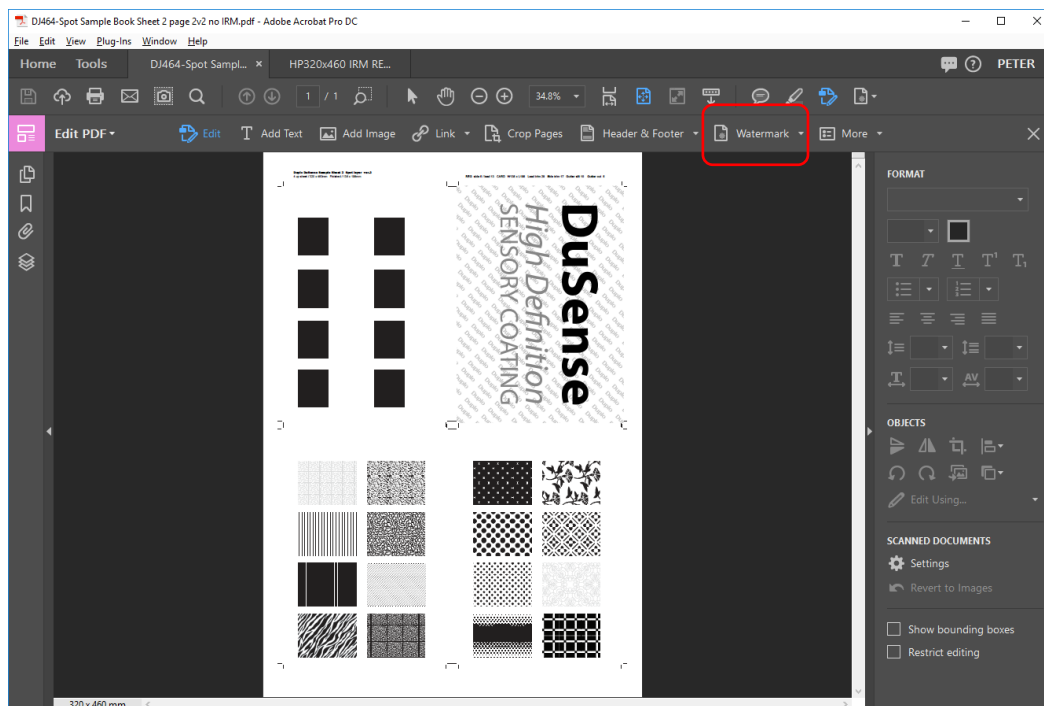
5. Addition of Registration Marks

12. Addition of Registration Marks - Acrobat

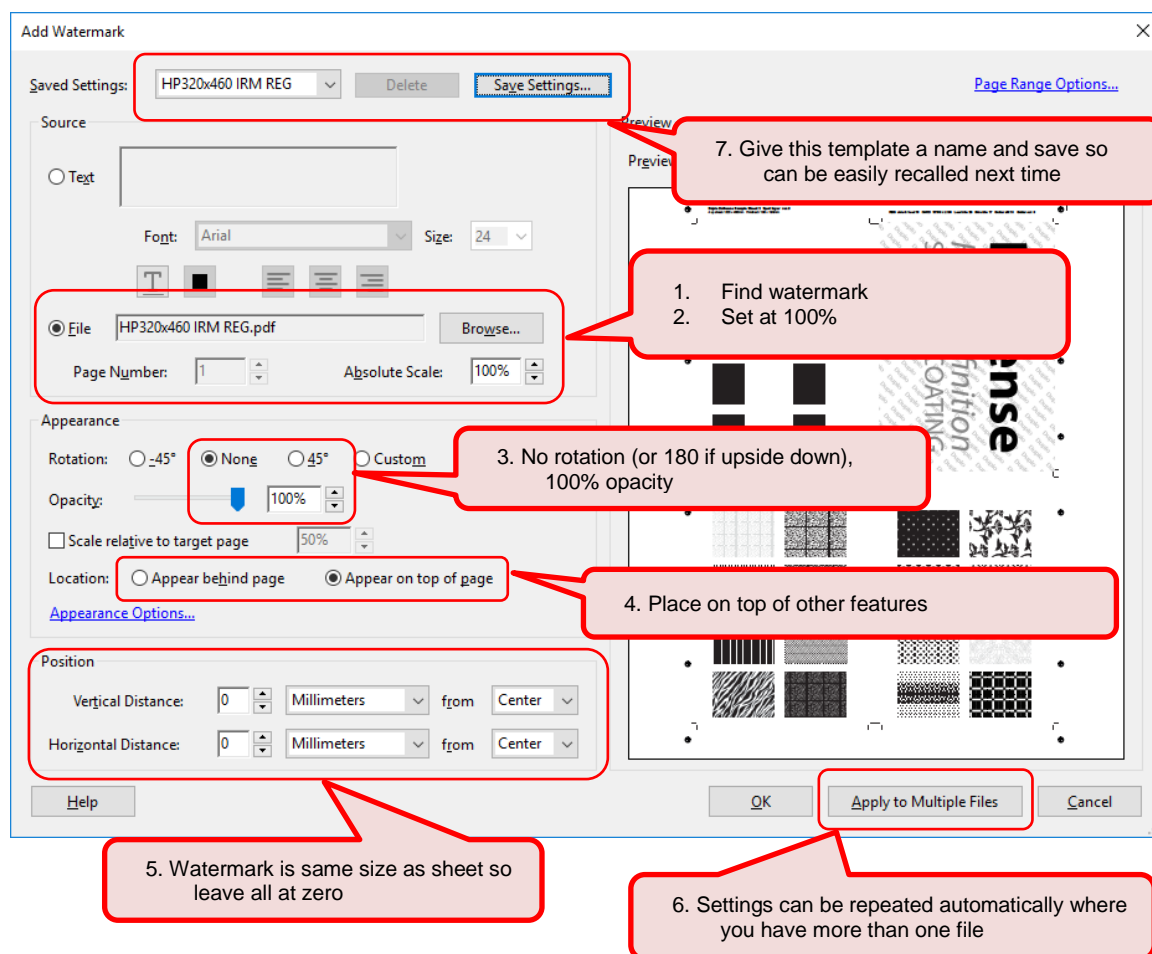
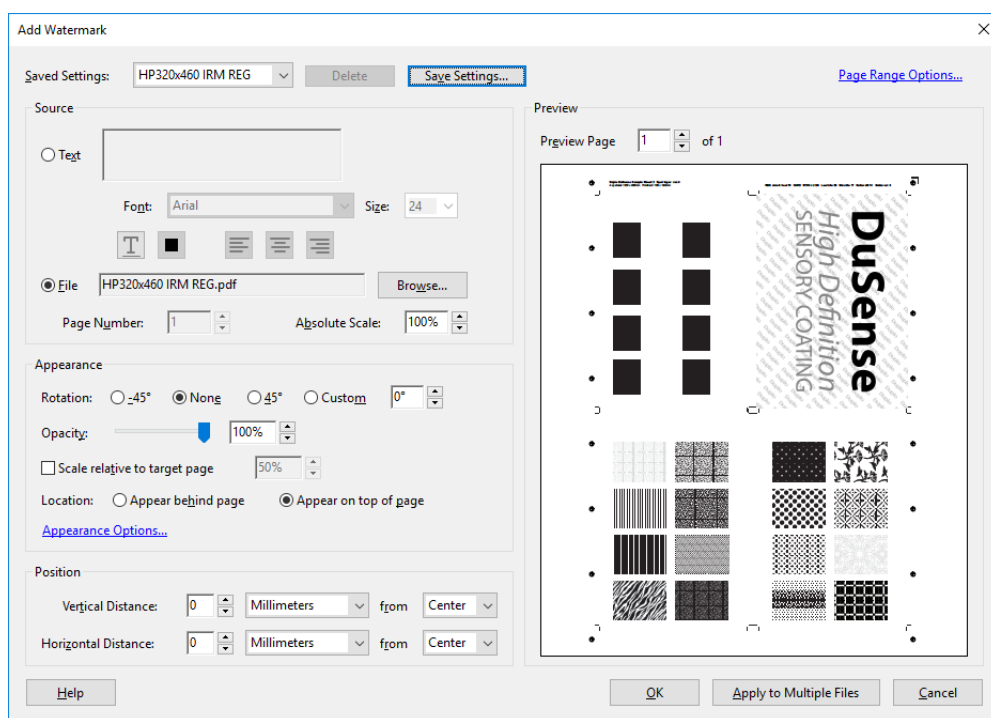
The pdf template has only the registration marks and this is overlaid as a watermark in Acrobat or some other pre-press tool at/or after the imposition stage. These marks **MUST** appear on the CMYK printed sheet, it is optional but **RECOMMENDED** that they appear on the Spot UV layer to assist the press operator.

Open the PDF file of the CMYK layer, or SPOT layer as shown in these steps.

View / Tools / Edit PDF the tool we will use is "Watermark"

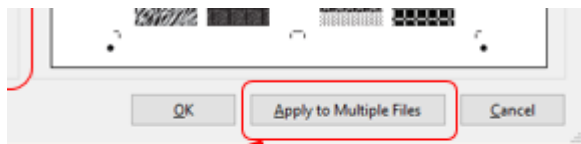


Settings as here



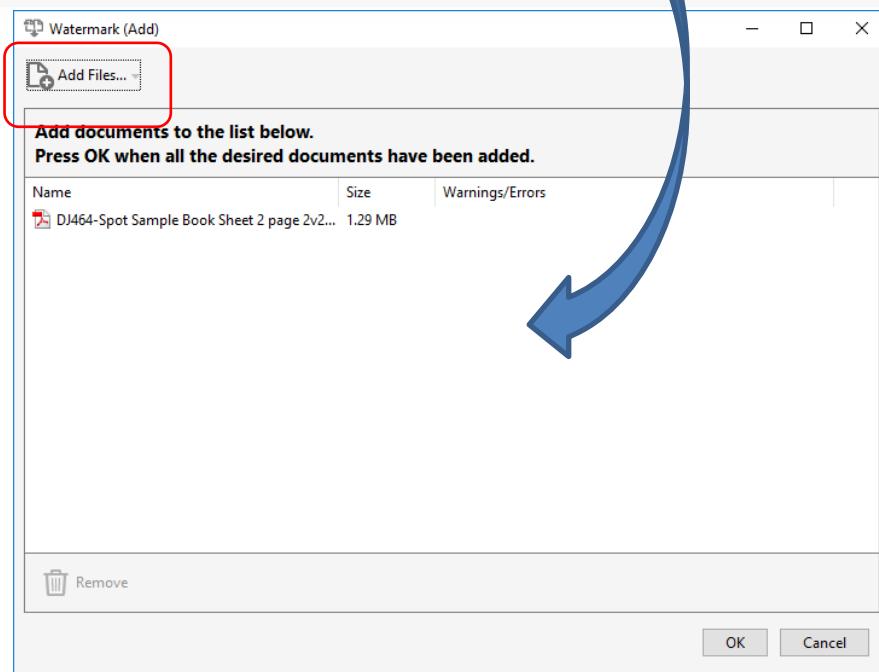
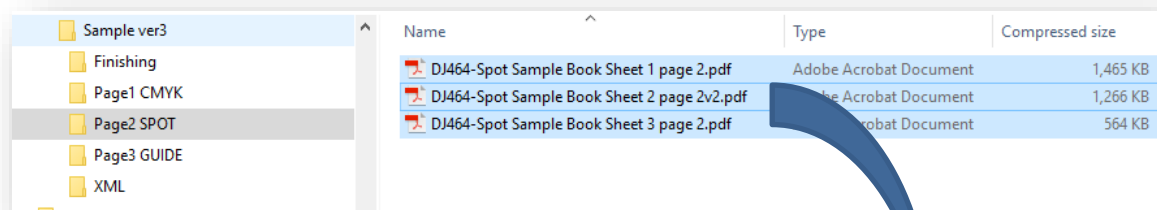
To apply (#6) 'Apply to multiple files', select [Add Files]

Typically, this can be used to apply exactly the same watermark using the same settings, to the CMYK layer file

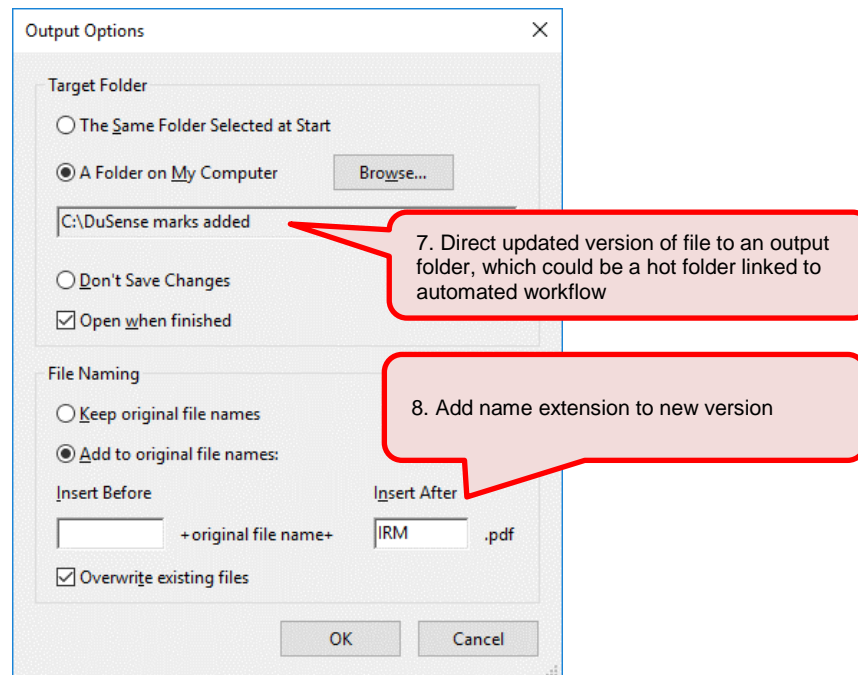


6. Settings can be repeated automatically where you have more than one file

Add further files to be processed



Select [OK]



[OK]

All documents are processed automatically with the same settings, according to the values in this template.

6. Printing

CMYK layer file to Colour Press

At time of writing, Duplo provides one formula of Sensory Coating, optimised for :

HP Indigo electroink (3XXX , 5XXX, 7XXX, 10XXX, 12XXX models)

Offset

Important : **DO NOT** apply a clear water based sealant as this will provide an inferior surface for the Sensory Coating

Laminates

Corona treated OPP (Oriented Poly Propylene) or Printable PET

Important : Dyne value (Surface Tension) should be a **minimum of 42 Dyne**

Further formulas are forthcoming, the next to be released Q3 2017 is for Xerox engines (ColorPress, iGen, Versant)

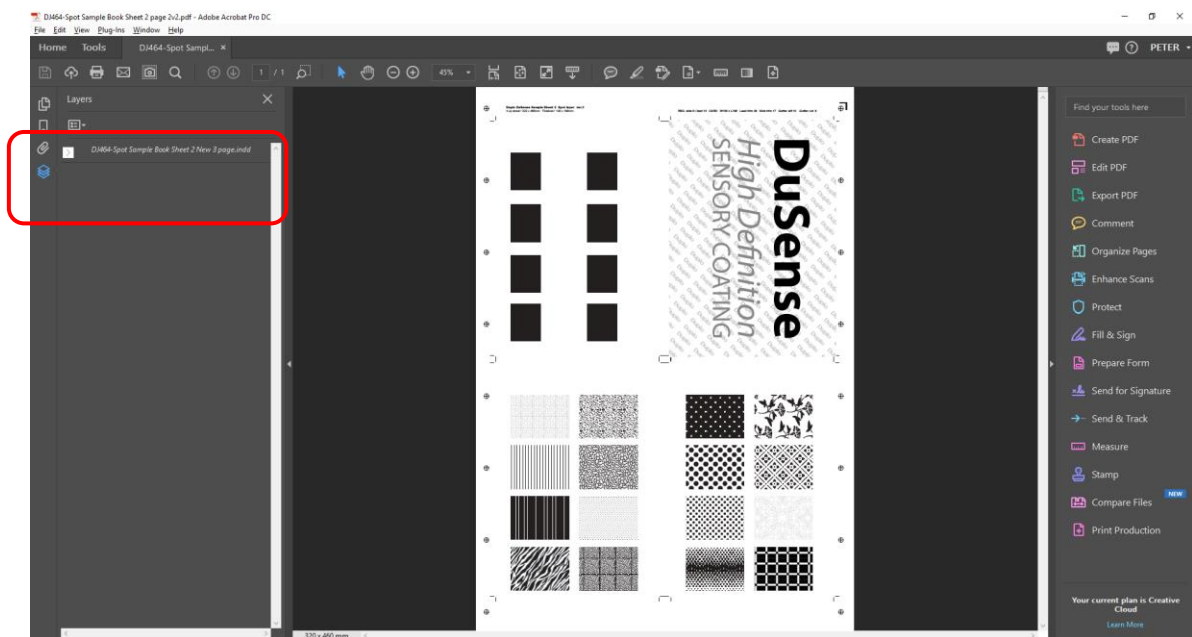
SPOT layer file to DuSense – refer to Section 7

7. Sensory Coating

13. File Submission - Duplo Machine GUI

The Duplo can absorb a PDF or TIFF but there is no way to select which layer to print, it is treated as a single file. The most common format is expected to be PDF, in which case the file should be split into one file for the Indigo and the Spot UV layer into a separate file for the Duplo.

In Acrobat, the Layers icon should not be present in the file, or there should be only one named layer (as here)

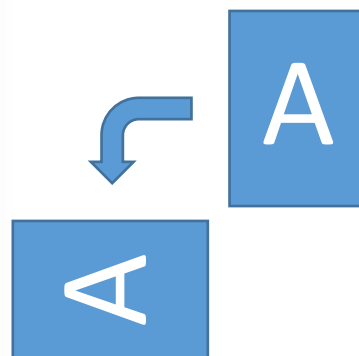
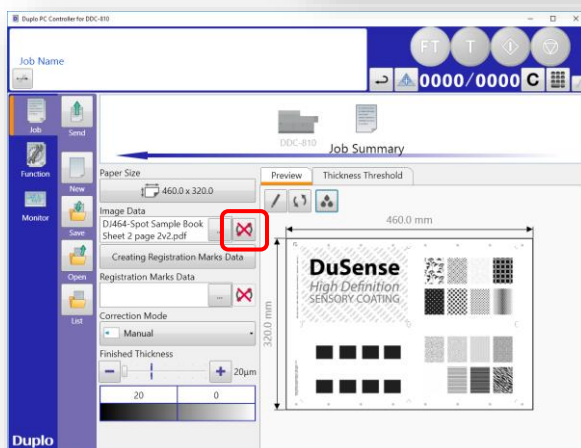


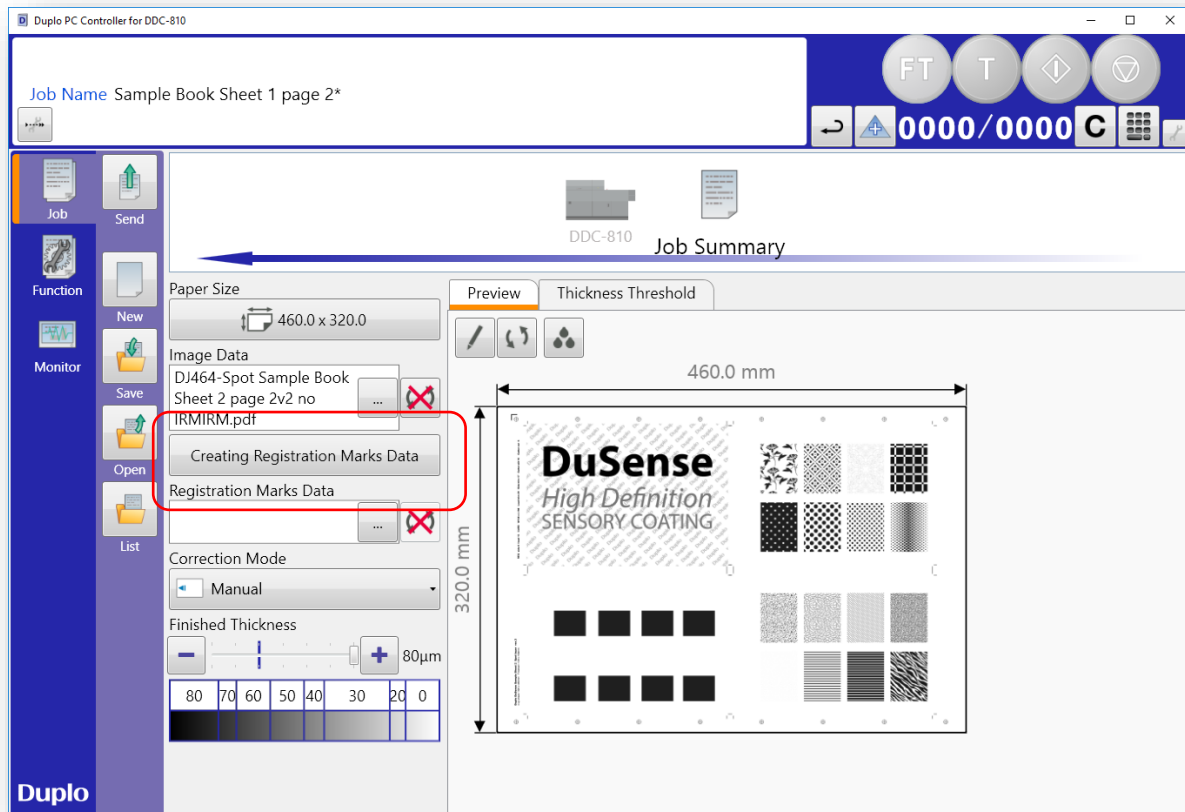
14. Generating XML data file for camera recognition

This file is loaded into the Duplo DuSense GUI either by :

- (i) [Open] previously saved job, the relevant data is loaded and the file points to the appropriate resource (PDF or TIFF) and also loads this. If an XML file of the same name is in the same folder as the image resource , this will also be loaded.
- (ii) (or) [Paper Size], then [Image Data] and locate the PDF or TIFF

The PDF is rotated according to this standard format. Should the image have been created to a different orientation, the [Rotate] button can be used to rotate the image to the desired direction. This can also be used if the sheet has to be turned 180 degrees, for example to avoid curl or over-laminate on one edge.





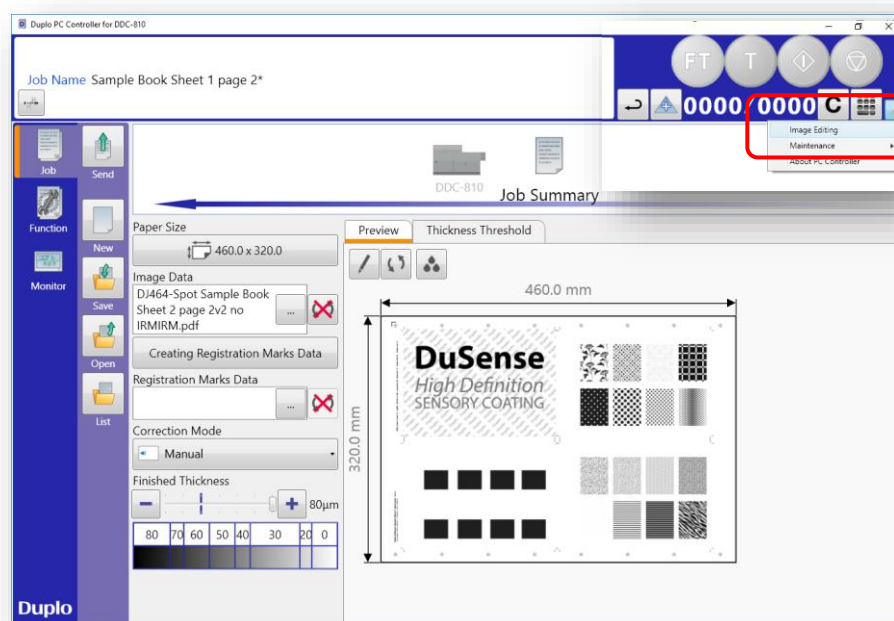
If the XML file has not been created at a previous stage, select [Creating Registration Marks Data], and the image will be analysed and the XY coordinates of the IRM (Image Register Marks) calculated. These will be saved as an XML file in the same location as the image data, and used as a reference point when reading the IRM on the CMYK printed sheet.

The operator will normally programme the sheet size and check sheet sizes when loading the media. Creating the XML file at this stage avoids errors where the imposition and actual sheet size are different to the intent.

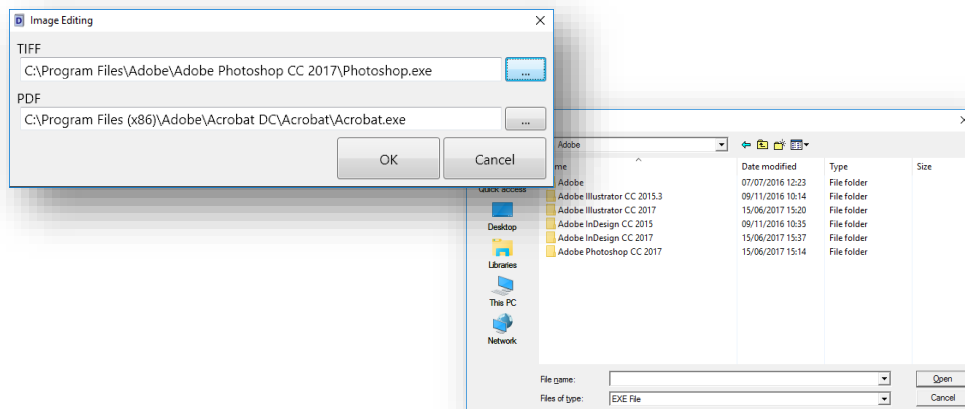
15. Image Editing - Duplo Machine GUI

The DuSense GUI is focussed on controlling the DuSense and obtaining high quality prints quickly and accurately. If the job artwork is not suitable in some way, the normal procedure should be to pass the file back to an experienced pre-press artworker for modification. The Duplo GUI does not provide surplus tools for image editing.

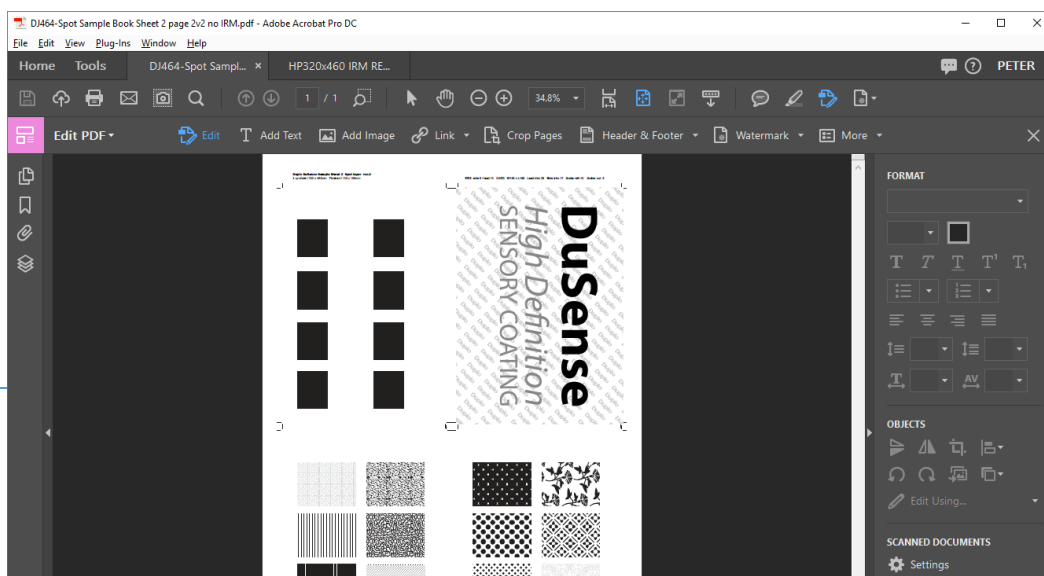
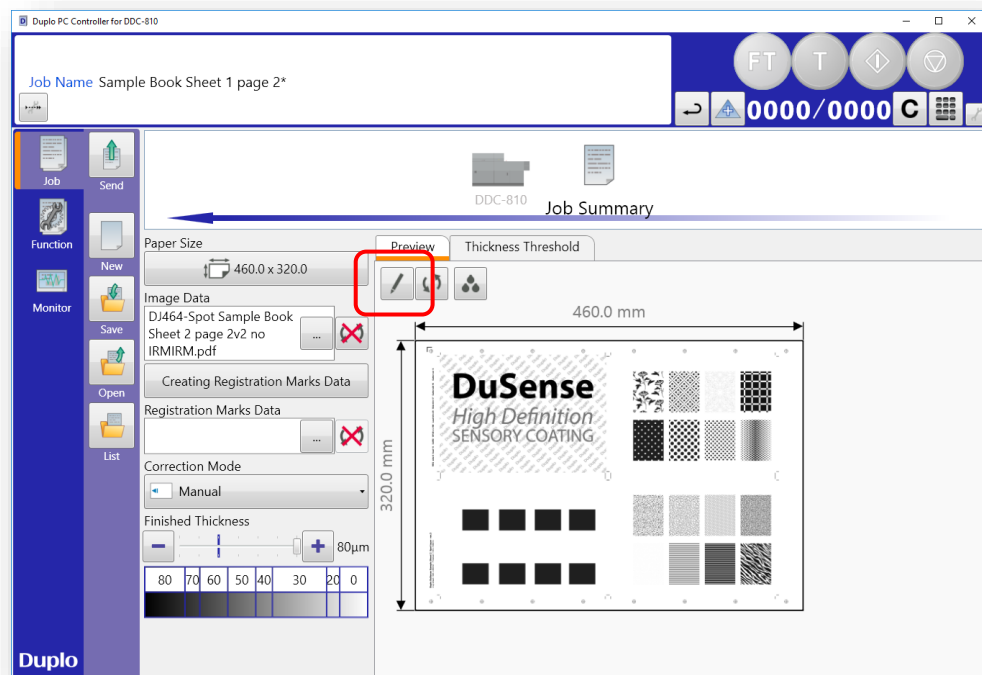
Should the operator wish to view the job in more detail (only a large thumbnail is displayed in the GUI), or have the authority to edit in some way, then a tool can be configured to open the job in the operator's preferred programme. Even should no editing be allowed, Acrobat Reader or some other free PDF reader can be installed at no charge.



Select the appropriate .exe programme



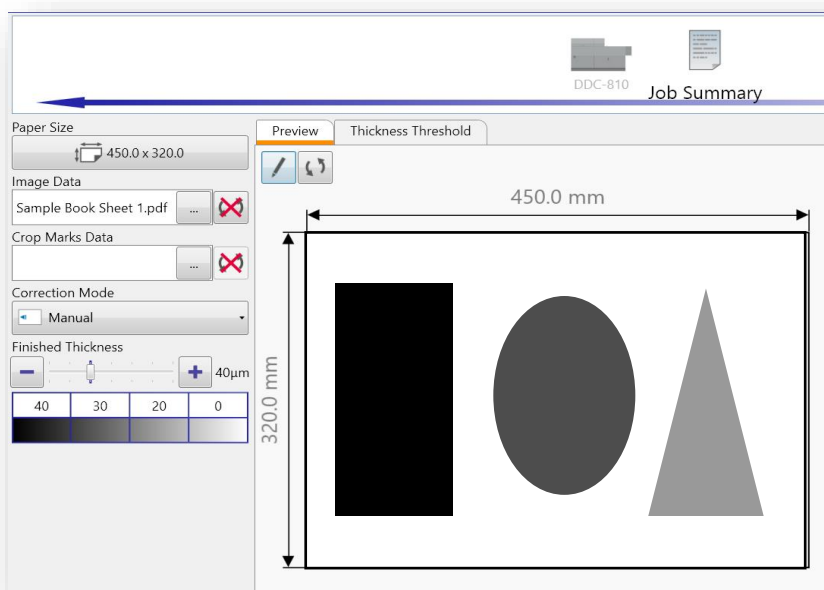
Once configured, the pencil icon will open the document in the preferred application. Adobe Illustrator allows more job editing tools and flexibility compared to Acrobat Pro.



16. File Operator controls - Duplo Machine GUI

Operator's view of job

When starting a new job, the GUI will default to a Finished Thickness of 40 micron



In this example, the press operator has selected 80 micron as the maximum thickness. The black square will create a thick 80 micron layer, the 70% black one of less thickness and the 40% black an even thinner one.

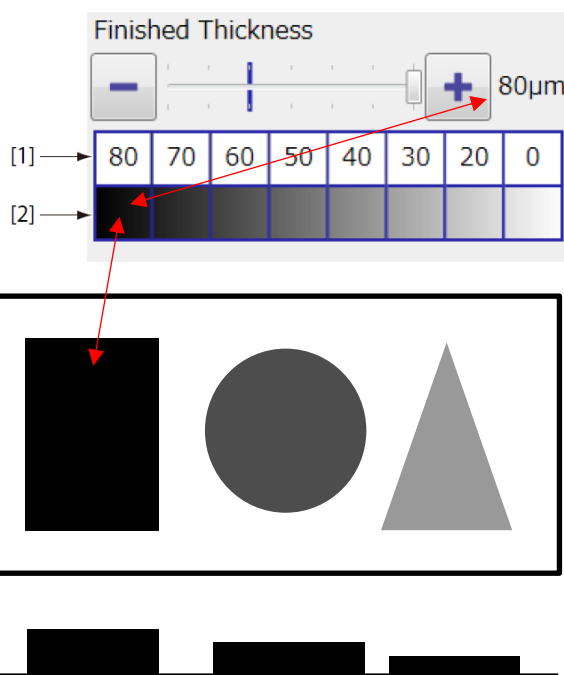
10 Use [-]/[+] to set [Finished Thickness].

Adjustable range: 20 to 80 µm

Default: 40 µm

[1] Ink finish thickness

[2] Color density of image data



Black	100%	90	80	70	60	50	40	30	20	10	0
Transparency	0%	10	20	30	40	50	60	70	80	90	100
RGB value (255/100 x Transparency value)	0	25	51	76	102	127	153	178	204	229	255

The MAXIMUM thickness that can be created is 80 micron

The MINIMUM thickness that can be created is 20 micron, however this depends upon the material, surface quality and size of element.

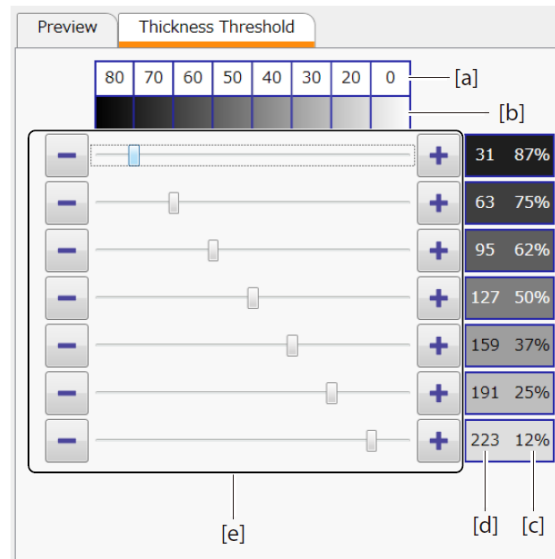
To assist the operator, he has a second tab “Thickness Threshold” (see next graphic) where thresholds for different transparencies can be adjusted. In this example, everything darker than 87% will print at 80 mic. A grey of 12 to 25% will print at 20 mic. A grey of less than 12% will not print.

12 Click the [Thickness Threshold] tab.

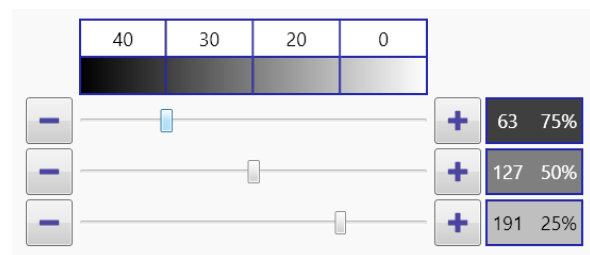
The thickness threshold value setting screen appears.

To change the print thickness, use [-]/[+] to change the threshold value.

- [a] Print thickness
- [b] Image data density
- [c] Threshold density (%)
- [d] Threshold RGB value
- [e] Set each thickness threshold



For an application where the maximum thickness is 40 micron, the threshold for no printing rises to 191 or 25% grey.

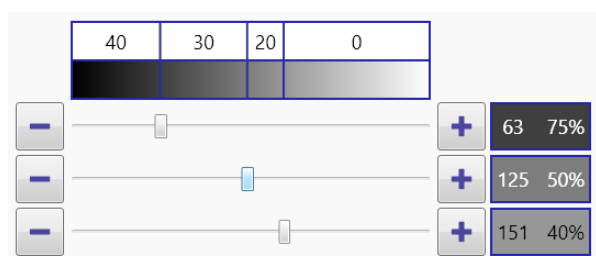


Example application:

If the fine text detail is 100% black then the base area for a heavy coating is too small and the coating will tend to spread out and blur the image. Define finer detail with a higher transparency.



If the grey transparency is too high then it may not print. But the operator has the option to adjust each layer, either boosting or reducing it to adjust the level of coating on the element.



17. Print Correction - Duplo Machine GUI

The integrated cameras allow for accurate positioning of the Sensory Coating. Compensation can be made for XY image drift, stretching/shrinkage, skew, and twisting distortion. However, the read window of the cameras allow for a maximum image movement from the intended position of 2 to 3 mm.



Combined X and Y image shift

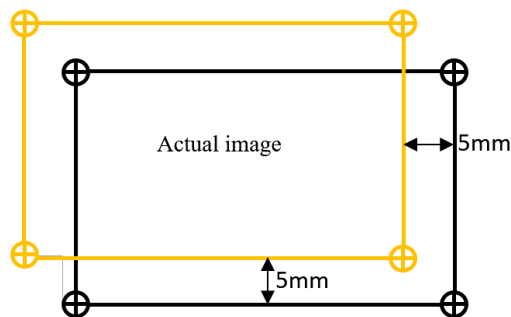


Image Stretch and Shrinkage

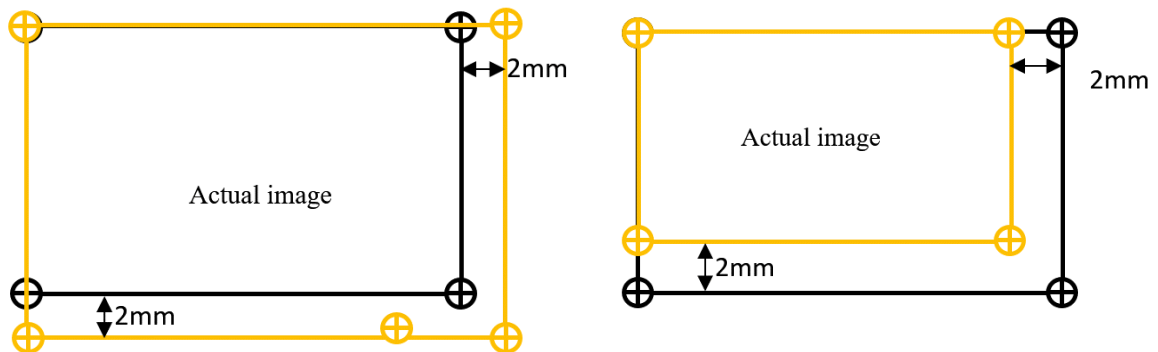


Image skew

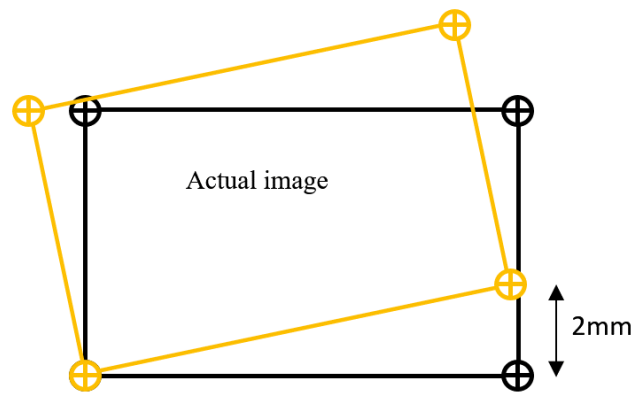
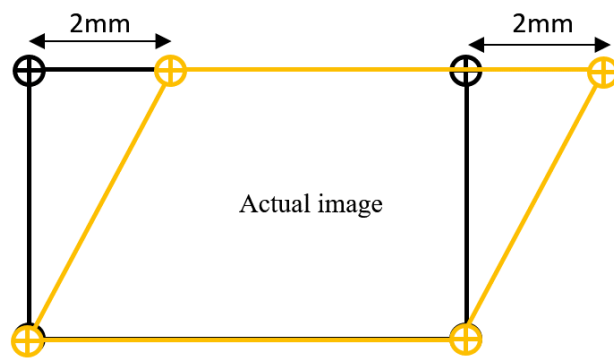


Image Twist distortion (parallelogram)



7. Finishing

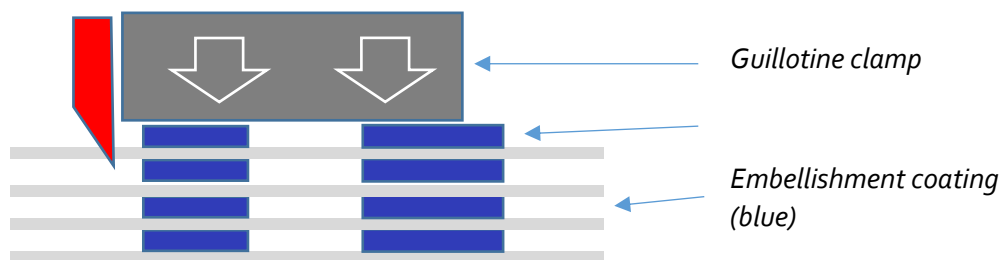
18. Common finishing issues with embellished print

Cutting should be performed on a sheet cutter, not a guillotine.

Cutting on a sheet cutter : It may be necessary to wait 24 hours for the Sebsory Coating to fully cure before cutting

Cutting on a Guillotine : Do not apply coating to within 3mm from the edge to be cut

The embellishment creates areas of high texture and variation. This will produce uneven clamping pressure at the guillotine. The unsupported media will tear as the guillotine knife cuts, bending and damaging the media and causing the coating to shear away and be unsightly.



Cutting each sheet one at a time provides the best results. Use a Duplo DC-616 / 646 / 746 to reduce or avoid common guillotining problems.

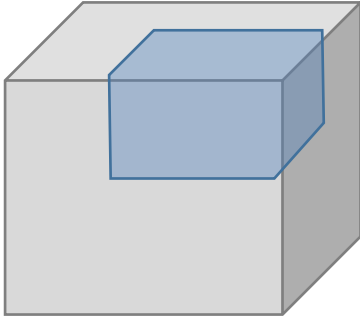


Embellishment is a coating, not an integral part of the media. Areas where the coating are applied should avoid positions where they will be directly perforated, creased or scored. Depending on the thickness of coating and media type, this can be as little as 1mm but as much as 3mm.

Media after folding :

Coating (Blue)

WRONG



CORRECT

