RISO GUIDE
DIGITAL ILLUSTRATION

VOL. 1

Printing Guide

Welcome to the Riso POP printing guide!
This e-booklet was created as a helpful guide to basic digital riso printing.

The risograph is a fantastic machine with a variety of options for creating exciting prints. I've compiled some tips and tricks to help you out while preparing your RISO print! I hope you find them useful.

I'd also like to point out, that there is no perfect way of using riso. Funnily enough, there are no 'official' guides available for printing with riso, so all the information you see here is a mix between: experience, open-source knowledge between studio's and diving into the extremly 'dry' machine manual. As a conclusion, I'd say it's all about best practices and being open for experimenting.

What will you find in this booklet?

1. Introduction to the Risograph Duplicator

2. The basics of riso printing
   i.   Layers
   ii. Overlay
   iii. Trapping
   iv. Gradients

3. File Prep

4. Imperfections & Best Practices

5. Creating an illustration/design for Riso
   i.   Creating your file FOR riso
   ii. Transforming an existing digital file TO riso
   iii. Getting your files ready!

7. Printing Options

Riso History

What is RISO?

RISO is the name of both a printer and ink company from Japan. Noboru Hayama started his company in post-war Japan (in 1946), calling it RISO. It means 'ideal' in Japanese, a poetic name that Hayama chose as he found it important that people should not lose their ideals in this period of despair.

Before the Risograph became an artist's printmaking tool, it was a machine born out of necessity. Following the end of World War II, emulsion ink was only available in Japan through an expensive importing process that relied on unreliable trading channels.

This was a direct result of Japan's strategy to use high tariffs on American and European industrial products, thus limiting money spent on outside materials as a way to recover from their period of economic depression.

On a quest to bring a cheaper alternative to the market, Noboru Hayama devised "Riso," a soy-based ink ideal for high-quality color printing at an affordable price. Nowadays the ink is also rice-based.

In 1986, it revolutionized short-run prints for places like schools, churches, and businesses; for anyone looking to print duplicates between 50 to 10.000 copies, the Risograph became their answer. But as technology developed and coloured ink jet printing became cheaper, the need for a Risograph in the workspace plumeted.

However, in recent years its use as an artist tool has substantially increased, mainly because of the opportunities it gives for self-publishing as well as the vibrant colours this machine is known for.

Get to know the machine!

The Risograph Digital Duplicator, looks like a regular photocopier. But its quite exciting form the inside!

A. Paper Tray: This is where you place your paper and wait for the machine to feed it into the machine.

B. Scanner/USB: You can scan separate layers through here and make masters directly. If you have a digital image you can send it to the printer via the computer.

D. Control Pannel: Here's where you talk to the printer, you can make a master; start & stop printing; move the drums etc. Before pressing anything, always have a member of the studio with you!

E. Master Rollls & Disposal Tray: The master roll is here - you cannot re-use masters so once you make a new one the old one is thrown away into the disposal tray.

F. Drums: A key element of the machine! A physical piece you put in and take out manually. Each drum has its own colour.

G. Ink Cartidge: This cyllindrical tube hold the ink and lays inside the drum. This is the piece that gets replaced when ink is running low.

H. Delivery Tray: The best part! Where your paper will land after flying out of the machine.
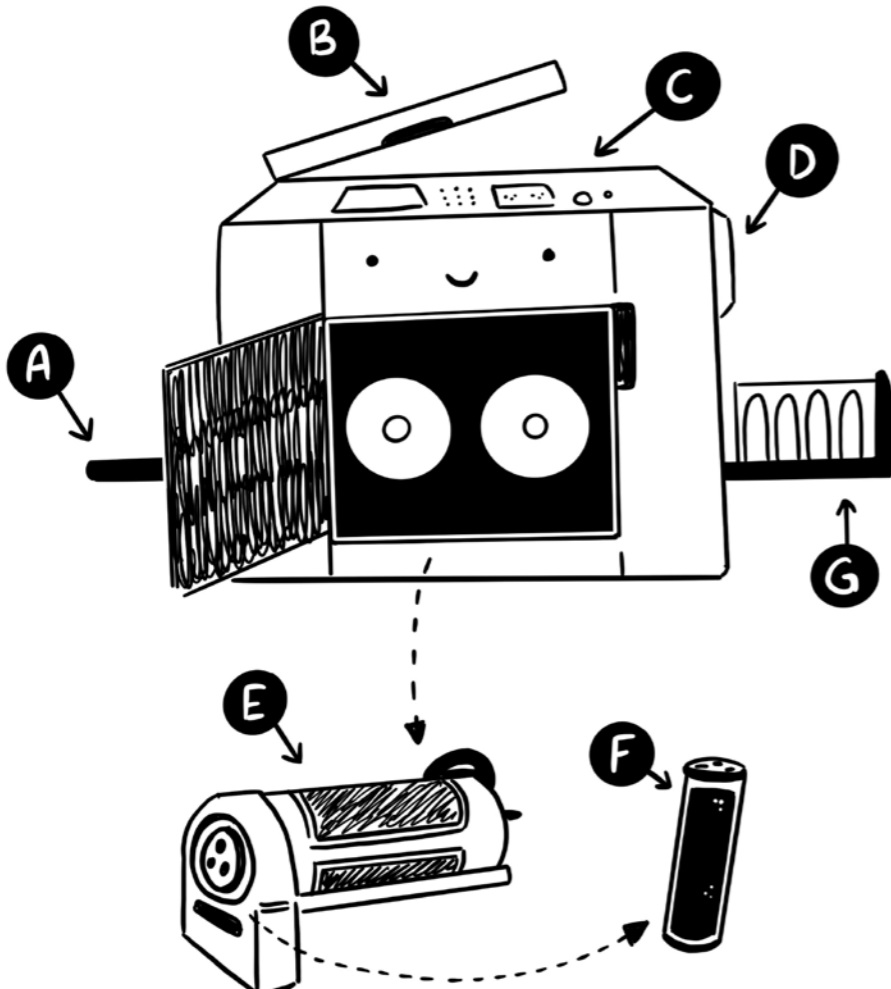
How it works

1. When you scan or upload an image to the machine, it first makes a 'paper stencil' and wraps this around the ink drum. These are called Masters. The model at the studio has two ink drums, so it can make two stencils.

2. Paper is placed on the 'feeder' where the machine rolls in the paper and adjusts the pressure depending on the weight of the paper.

3. Paper is pressed and passed through one or both of the ink drums before it comes out to the delivery tray.

In other words, the machine creates a 'digital' stamp on individual colours and together they create a colorful image.

You could say it's a digital screen printing process.
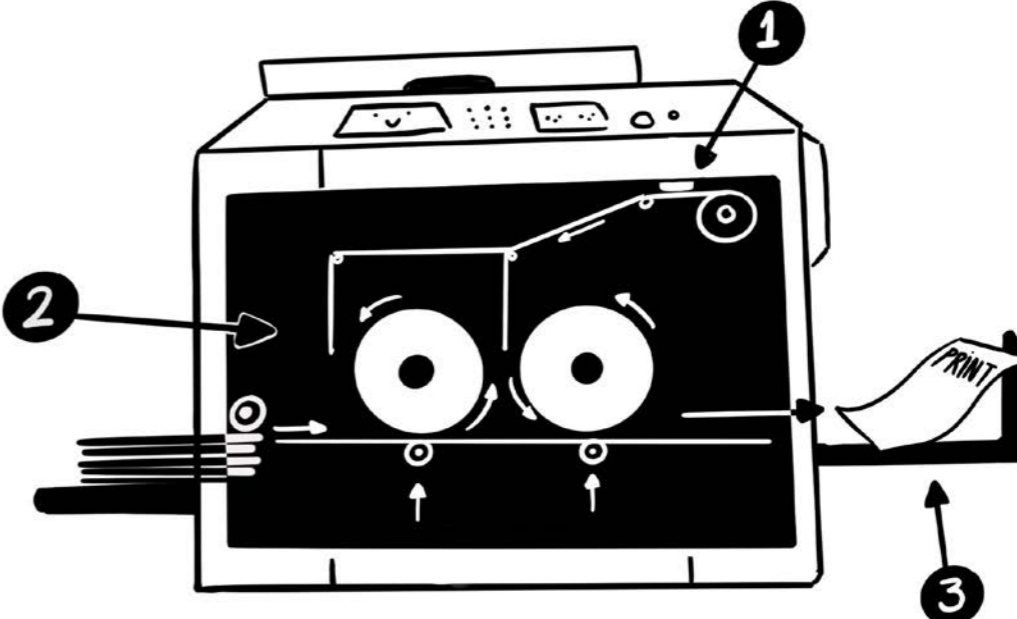
2. The Basics of Riso Printing

Layers

As explained in the introduction, the machine prints each colour separately. The colours are translucent, not opaque, this means we can work with layers to create new colours.

This translucent characteristic also means that the paper on which we print will also have an effect on the final result.

Each colour has a range of saturation, going from 100% to 10% - although anything lower than 20% will be hardly visible.
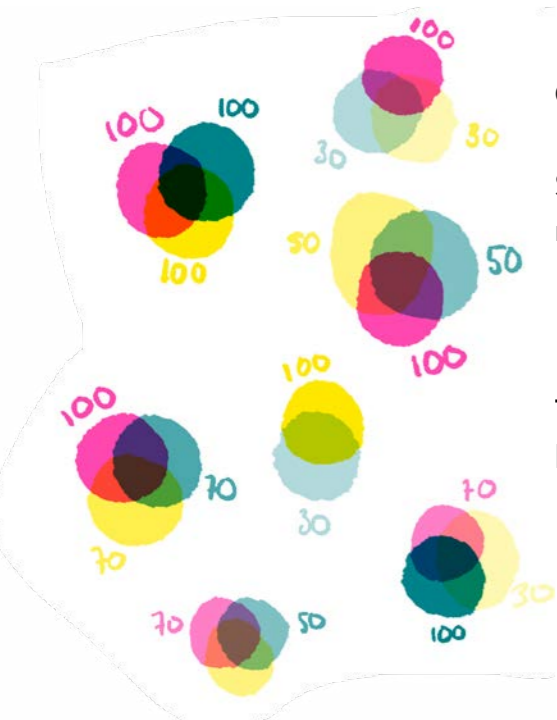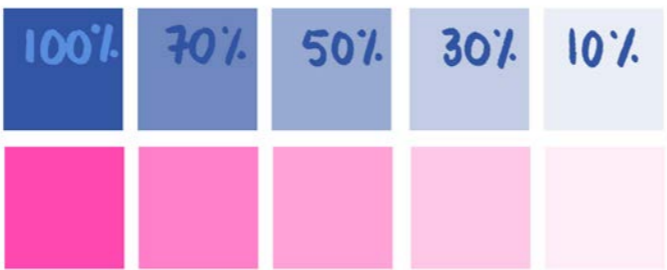
Overlay

So, when we put two colours on top of each other, we create a new one. This is called overlay effect.

In order to visualise this digitally, you can use the MULTIPLY effect.

Tip: to create more interesting colours, try using lower saturation levels, especially when working with more than 2 colours.

Jiggle & Trapping

In case that you don't want your colours to mix, you have to work with cut-outs. Once you have your two shapes, you can either go for:

Jiggle option: where you leave a 'blank' space around your shape. This can create a fun effect when registration is uneven during printing.

Trapping option: where you expand the shapes so they overlap slightly. This can minimise the effects of uneven registration.
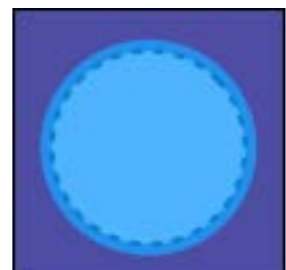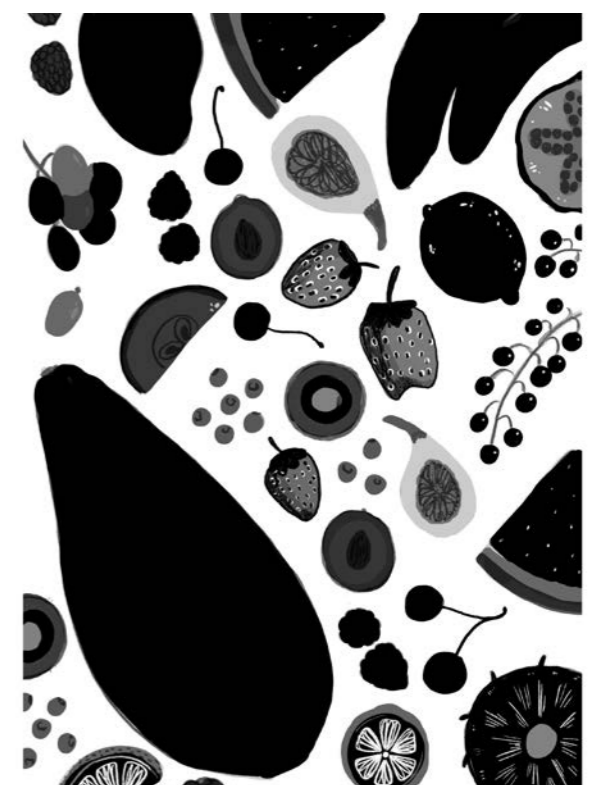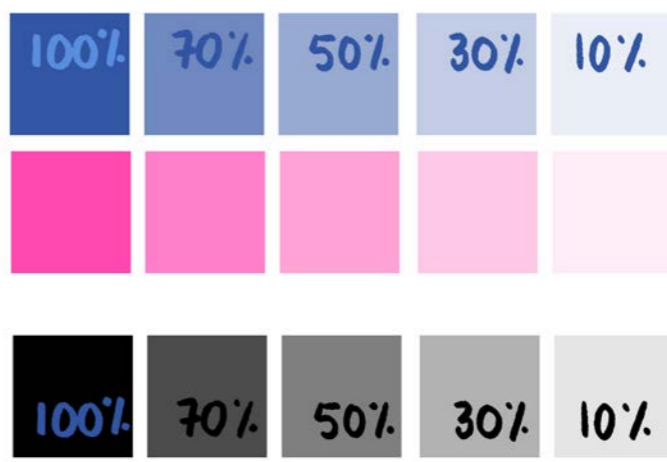
Greyscale

Riso is known for its cool colours, but the file the riso needs is black & white.
Wait.. what?
It sounds counter intuitive, but this way the machine can take 'raw' information and print it in any colour you want!

So what does this mean? If you take the saturation scale we had, it's greyscale translations would be the following (for both pink & blue):

All layers together

3. File Prep

Before we go into our digital drawing, it's important to have the file prep ready. These are some things to keep in mind.

File Specs

Like with most difgital prints, please set up your file to a min resolution of 300dpi.

Borders

Because of how the master is made within the machine, it is not possible to do full bleeds.
The borders are 4mm on the sides and bottom, while the top in 7mm. Here is where the roller picks the paper and therefore no printing will be shown in this area.

Tip: I personally like to make this margin bigger and then have a nice border around my design.

If you still want full bleed, then you can cut the borders afterwards.

7mm
AVOID HEAVY INKING
4mm
4mm
4mm

Best Practices

Avoid heavy inking on head of paper as it will leave marks (for more on roller marks go to section 4)

Avoid big homogenous flat areas and for large shapes, please do not use 100% fill, lower to 70% or 80%
Why? If there's an excess of ink pressed on the paper, it will get stuck on the drum.

Tip: If you still want a flat color on a background or big shapes, add textures or a gradient!
But NO 100%!
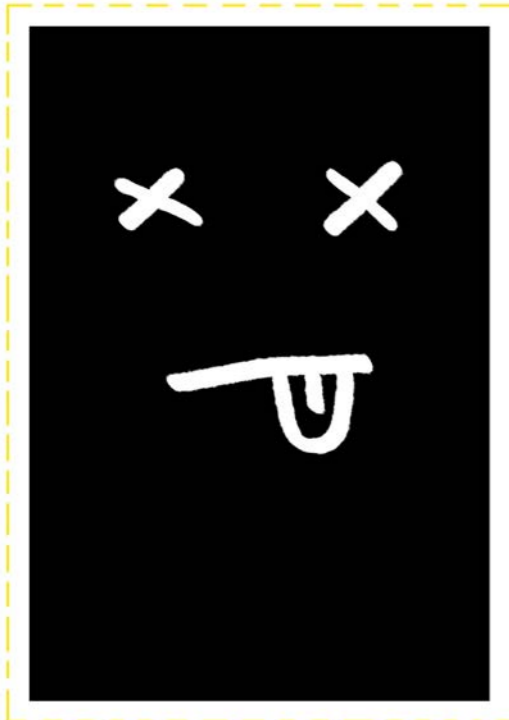
4. Imperfections & Best Practices

Risograph printing is not a tool for perfectionists… sorry!

The machine has various quirks that can affect your printing result. But, like with many other printing techniques, you can embrace some of the imperfections and make them your own. While others you can avoid by following some basic rules.

RISO + UNICORNS
NOT PERFECT BUT UNIQUE

Roller Marks

The printer uses rubber rollers to feed the paper through out the machine. When wet ink reaches the rubbers, it can leave what we call roller marks. These marks are not permanent. You can easily erase them with a soft eraser; but they are a pain if they make your artwork dirty (never try to erase them form a printed area!!!)
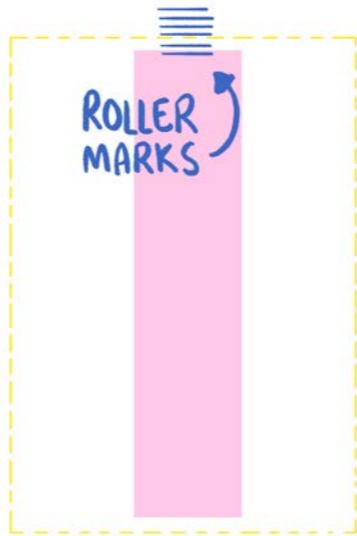
ROLLER MARKS

We can reduce the roller marks by keeping the following in mind:

- The rollers will always pick the paper in the middle; so by reducing the amount of saturation on   this area of your print you can reduce smudging.

- When printing more than 2 colours, wait 24hrs minimum for ink to dry, this way the rubber will catch less ink.

-Printing from light to dark.

Uneven registration

We already talked a bit about this effect. Uneven registration occurs as a combination of movements within the machine as well as the process of 'rolling & stamping' in which the colours are pressed onto the paper.

We can correct some of the registration directly on the machine, but as we print, this can change again.

This means that we cannot guarantee perfect outputs; but this also means that every print is just a little bit different and therefore unique.

It is one of the charms and specific looks of riso.
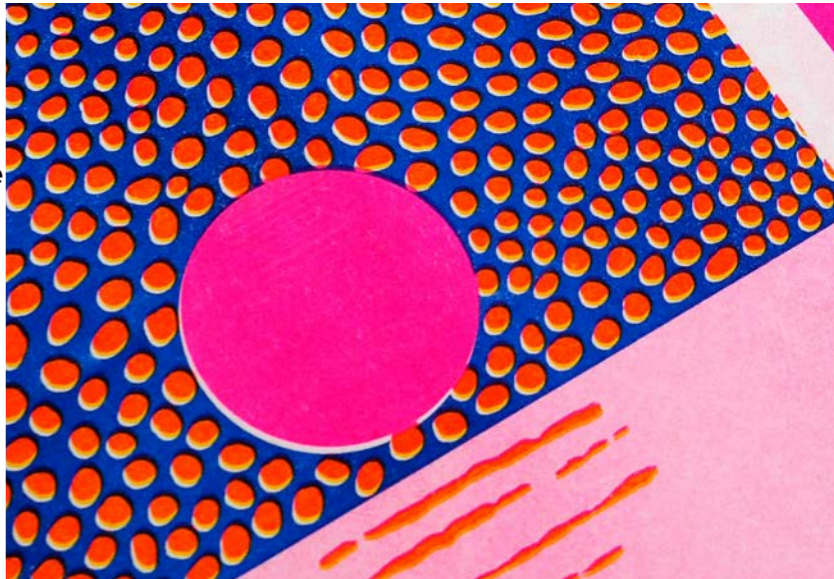
5. Creating an illustration or design for Riso.

It does not matter what type of digital programme you use, but you should be able to:

- Create separate layers
- Use MULTIPLY effect
- Be able to transform to greyscale
- Export to PDF

In this booklet we'll be looking specifically at Photoshop.

Let's begin with some simple steps to keep in mind when working on your illustration:

- Create a new SWATCH with the Riso Colours you will use, this way you have them readily available.

- Use LAYERS for separate colours as well as for different OPACITY levels.
This way you can control the saturation on each element separately.

- Set the MULTIPLY effect on ALL your layers. This way you can see what the effect is of colour mixing. Also, remember that the same colour adds up. So if you have a layer of yellow at 20% opacity and on top a layer with 50% the result is 70%.

- You can use gradients and textures. It might be that some detailed textures might not translate

KEY FOR MIXING COLOURS

- You can use gradients and textures. It might be that some detailed textures might not translate to print.

- *Using text?* Min size is 7pts.

- *Thin lines?* You can go as low as 5pts, but it's best not to work with extreme thin lines as they can get lost during the printing process.

Ok you are ready to go! Let's go for greyscale!

This is the step where most people get lost or forget the basics of riso and end up with a wrong PDF.

Remember: Black = 100% saturation.
Don't be scared of black!!!

100% YELLOW
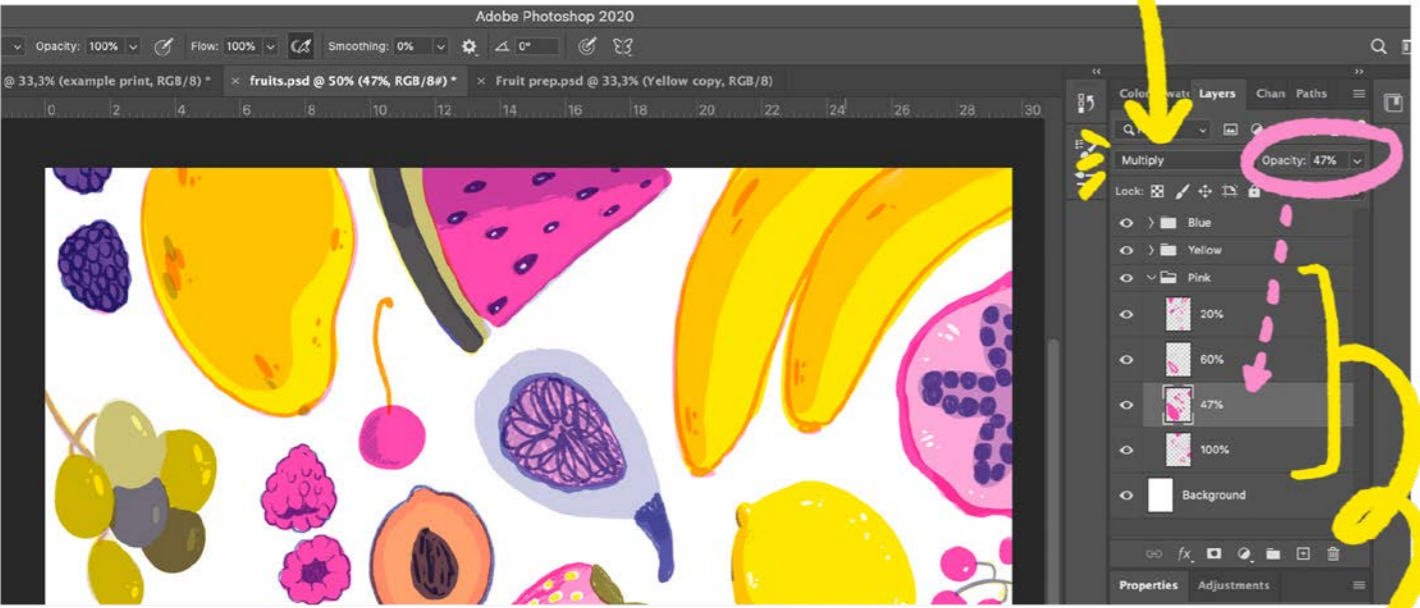
There are 2 methods to achieving greyscale: FILL OPTION and GREYSCALE MODE

When to use

FILL OPTION: When you have drawn your design on separate layers.

Pro: Your file stays on RGB/CYMK mode so you can easily go back to your coloured layer.
Con: Not handy for scanned in drawings where background is difficult to remove.

GREYSCALE MODE: When you have an already made drawing, maybe you didn't use the riso colours, or you scanned in a drawing.

Pro: Very easy to convert
Con: Immediate result is not ready for print. You need to play with setting to get it right. Also, your whole document becomes greyscale.

We will now look at FILL OPTION.

With this method, we ask the programme to take all the pixels available and fill them with one colour, preserving the opacity levels.

1. DUPLICATE your layers! We don't want to loose any information.

2. (optional) MERGE all the layers of the same colour (no background!)

3. Select black as your FOREGROUND COLOUR
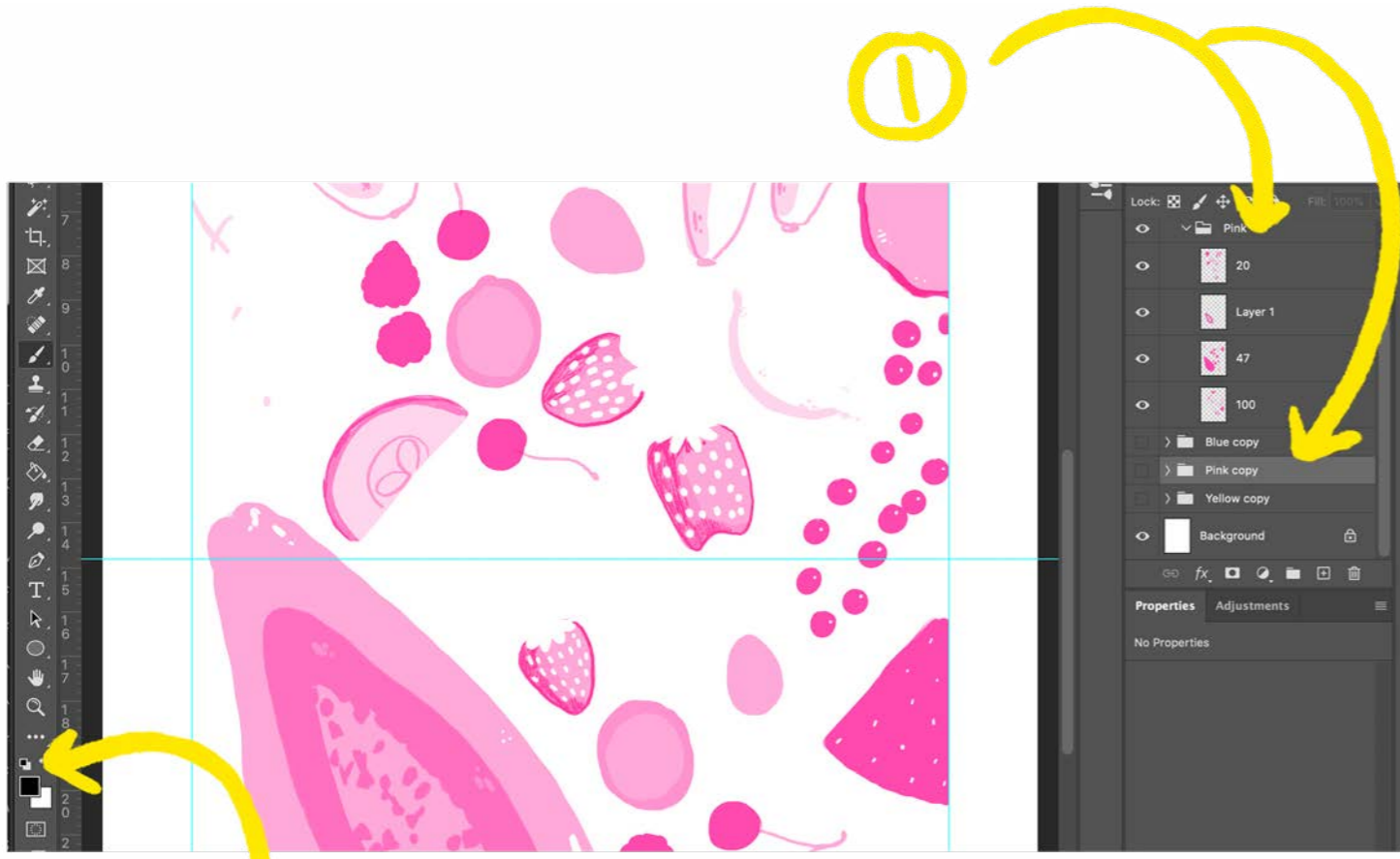
4. Select the layer you want to transform and NAME properly! Once it's greyscale it gets confusing…

5. CTRL + SHIFT + DELETE this will activate the command fill and a window will open.

6. Contents FOREGROUND COLOUR and tick PRESERVE TRANSPARENCY
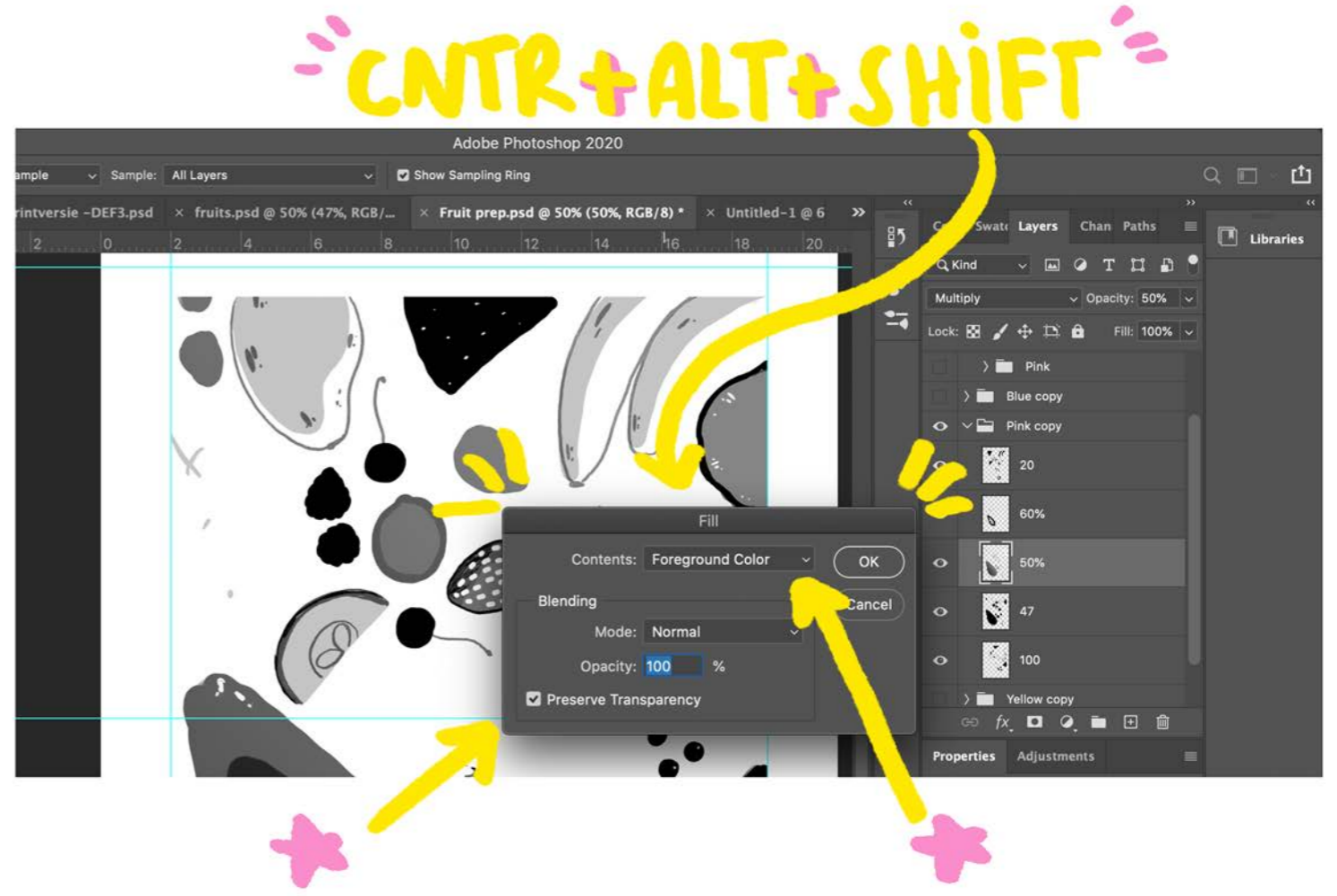
Ta-dah! Your layer is now in perfect greyscale to print!

Trouble shooting:

Huh, there's some black lines that I didn't draw!
Did you add white to your drawing? The command sees this as pixels 100% saturated, hence why they turn black.

Ahh my whole canvas is black!
That might be because your layer merged with a white background. Try to go back and undo this.

Transforming an existing digital file to RISO

We will now look at the GREYSCALE MODE - as explained before this is a great method when you already have an illustration that you'd like to set up for riso.

1. Make a duplicate file, so you can work on it without loosing your original.

2. Group the layers per Riso colour you want to print with and name them properly.

3. Go to IMAGE > MODE > GREYSCALE

What happens now, is that the programme will take the full colour range and use that to create grey-scales, the problem here is that light colours, will be read as light grey instead of dark grey or black.
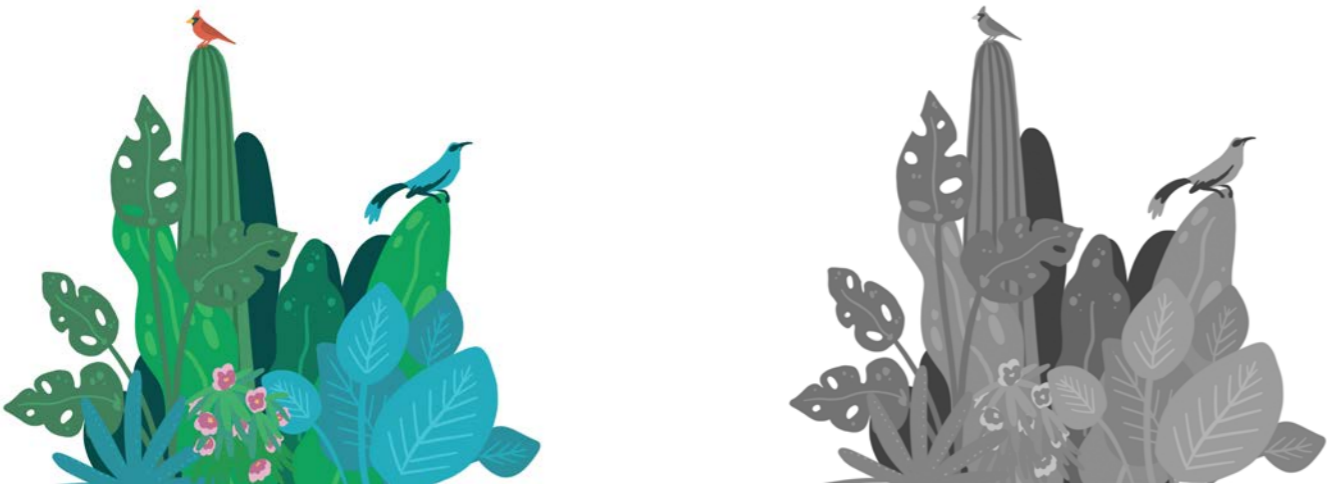
4. Lets go to CURVES - move the cursor at the bottom to darken or lighten your image towards the wanted levels of black.


④ MOVE CURSOR

Let's test our results - we will now transform the greyscale layers to riso colours.

5. DUPLICATE the layer again, to have backup.

6. Go to IMAGE > MODE > RGB

7. Double click on the layer or LAYER STYLE > COLOUR OVERLAY

8. Select the riso colour of choice, and set BLEND MODE > SCREEN

9. You can do this for all your colours. You will notice that you can't use MULTIPLY effect. So let's go to LAYER > RASTERIZE >LAYER STYLE

You should now see how your print will look like with the riso colours.
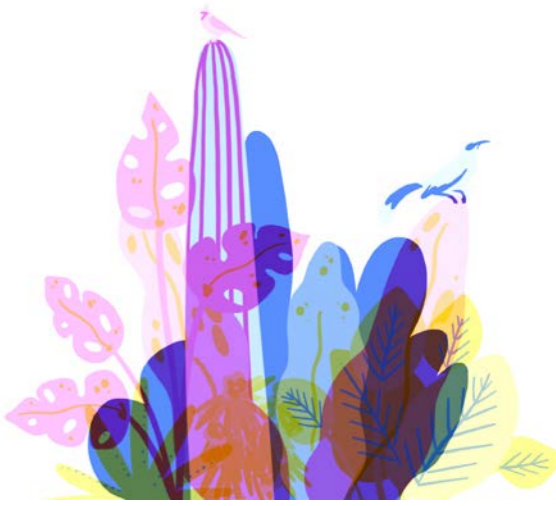
If you are happy with the result you can export each colour as a (greyscale) PDF. **Remember to name your file accordingly!!!**

BUT

Let's say you start tweaking and chaninging things once you have the riso colour version... going back to greyscale will have the same problem as before.

10. Instead of greyscale, you can use LAYER ADJUSTMENTS > BLACK & WHITE for each co lour group- here you can move the coursor of the color chosen, to darken the image.

THIS IS NOW 80% ⑪
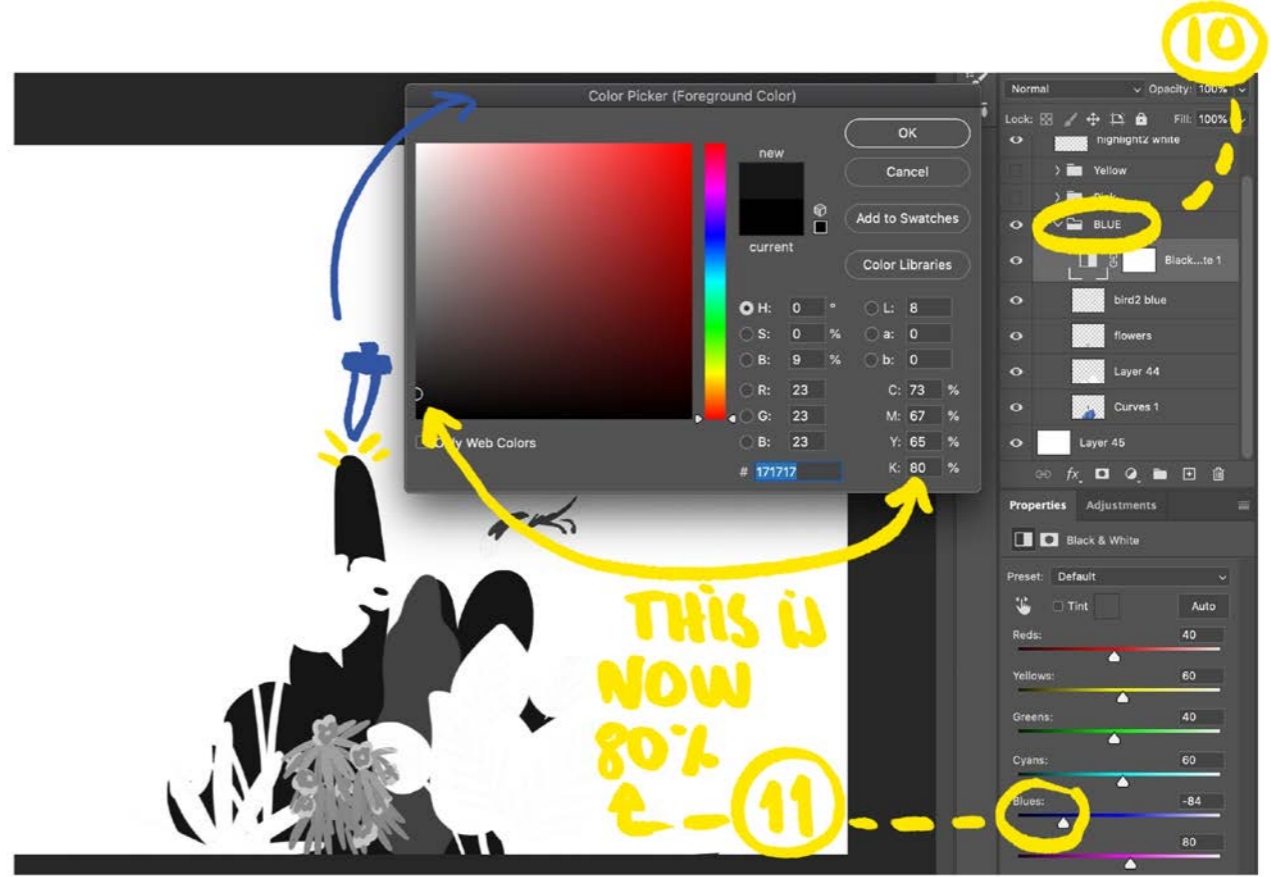
11. To get the right colour, you can use the color picker on both ethe coloured version as well as the B&W.

I understand that it all feels a bit complicated or that we are doing the same steps twcie. Why set evrything to greyscale at the beginning at all?

By changing to greyscale in the first steps, we create an equal color throughout the layers, and minimize pixel information. So we can add our riso colour on top and it can use the saturation as reference.

7. Printing Options

When printing the information of your PDF is translated into micro dots. The machine has a 'comb' that punctures the master to create the stencil. This is called Screening.

Riso has two options for screening:

Grain-touch:

Is a randomised diffusion pattern.
Great for illustrations & flat gradients.

Screen Covered:

Creates a classic halftone pattern (organised dots).
Great for photography or a more textured/experimental look.

We can adjust the frequency and angle.

Screen Frequency: Will control the size of dots.
Higher number = more dots, so less visible.
Great for illustrations & flat gradients.

Screen Angle: Will control the angle the pattern is set to.
Each colour should have a different angle.
Great for photography & experimental output.
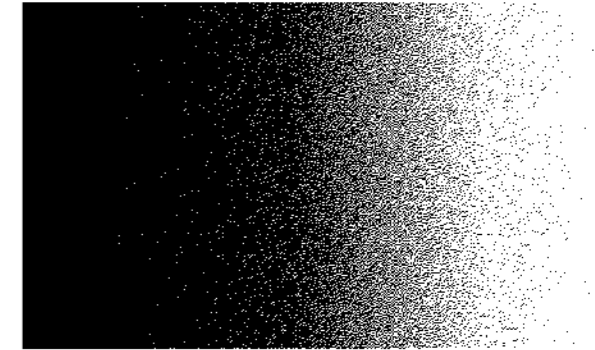
Grain-touch
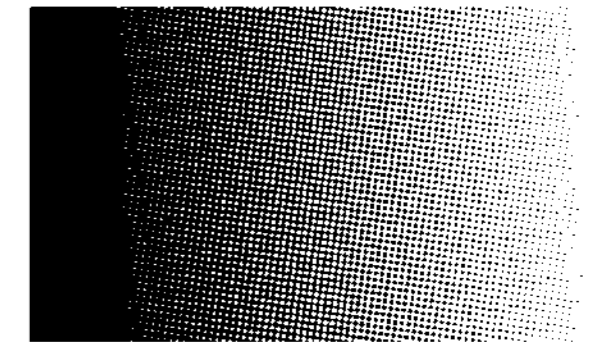
Screen Covered

To read more on halftones:
http://the-print-guide.blogspot.com/2009/05/halftone-screen-angles.html

Let's talk paper

To have the best possible prints we also need to work with proper paper.
Paper should be uncoated and with a slight structure.

The maximum paper thickness the machine can handle is 300gsm. But you would need to feed the printer 'by hand'. The best weights are within the range of 80gsm and 220gsm.

Side Note: it has come to my attention that for many people 'thick' paper equals quality.
If you are interested in researching paper, you can find beautiful types of paper that would be considered 'thin', but due to their structure and roughness they hold riso perfectly, maybe even better than thick paper.

At the studio you can find 2 standard paper types:
Biotop 160gsm and Polar White 200gsm.
Other favourites: Munken family & Fabriano.

See you at the studio!

Riso POP