CARBON TRANSFER PRINTING

WITH DIAZIDOSTILBENE

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This document was translated by Picto Benelux to serve as a reference document in its research to replace dichromates with alternative, less toxic products that can be purchased over the counter in the U.E.

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Table of contents

1) INTRODUCTION

a) Presentation

I practice digital photography and have a lot of fun with it. I have a nice camera with some nice lenses. I have a subscription to the Adobe Creative Cloud suite and use Lightroom and Photoshop to edit my pictures. I occasionally print my photos in a book. The results are beautiful.

But there is something I miss. Everything stays digital until it's printing time. As for this last step... I leave it to a German printer whose work is perfect.

In short, I want, need, to really touch the picture, the paper, the products that will give the final result. Somehow, I want, I need, to "get my hands dirty". I could have been tempted by analog small or even medium format photography with its cameras, chemistry and the joy of wet processing. Although I have read many articles and forums on this, and have dreamed while looking at many cameras on second-hand equipment and auction sites, I never took the plunge and remain convinced that it would not be, today, my best choice. I could have gone back to the heyday of photography, back to the 19th century, to embark on the magnificent adventure of collodion photography. I will certainly come to it one day, for its aesthetics and its special workflow. But I'm not ready for this yet. Minimalist photography with pinhole cameras is just as intriguing. But after all, no, I'm not sure that this is going to be my photography practice of choice.

By dint of searching without necessarily knowing what I was looking for, I ended up finding an infinite source of alternative printing processes that tickled my neurons: Chibasystem, Ambrotype, Van Dyke, Cyanotype... A kind of link between the chemistry of 19th century photography and the modernity of my current equipment. I must admit that here I would have a fantastic playground!

In short, I jumped at the chance, happy with this discovery. I was forgetting the main thing... These processes require time, a suitable work space and a bit of DIY capacities. I do have time, but have to admit that living in a flat and not being a real handyman, I'm making my life very difficult..

I tinker, I mix and expose on the dining room table, I put to dry in the cellar, which is less crowded than my bathroom, which is only used when wet processing is involved.

This document is therefore primarily intended for beginners and the curious who may wonder whether it is realistic to take the plunge! For me, the answer is quite clear: it would be a shame not to do so. :-)

b) Did you say "Carbon Transfer"?

The principle of single carbon transfer is to create a tissue acting as an "ink pad", and consisting of a layer of pigmented and (mainly UV) light-sensitised gelatine which is deposited on a temporary support (a flexible sheet such as yupo for example).

A negative of the size of the picture is created and laid down on the gelatine tissue when it is dry, and then the whole is exposed to "sunlight" either directly or by means of a UV exposure unit. Diazidostilbene has the property of hardening the gelatine when exposed to UV light. The clear areas of the negative allow the gelatine to be fully exposed, which will fix the blacks and shadows. The darker areas of the negative retain the UV light and will therefore reveal the lighter areas of the print.

The gelatine of the tissue is then brought into contact with the final support in a water bath at room temperature. Finally, the sandwich is soaked in a water bath at 42°C to melt the unhardened gelatine and separate the temporary support, thus revealing the image.

Oh, I forgot... You may wonder how far this process can go!

- https://www.franck-rondot.com/blog-photographe/374-tirage-charbon-simple-transfert-simple-couche-au-das-diazidostilbene.html
- https://thewetprint.com/en/gallery/

c) Vocabulary :

- **Glop**: A mixture of pigmented and sensitised gelatine which is applied to the temporary support.
- **Tissue**: Temporary support on which the mixture has just been spread. The term probably comes from the fact that this intermediate support was disposed of, like a handkerchief, after use.
- **Initial support**: Sheet used to create the tissue
- **Final support**: Sheet of paper on which the picture is transferred.
- **DAS**: Diazidostilbene.

d) Disclaimer :

I'll say this only once: Make sure you fully understand this warning.

The precautions listed below apply when handling Diazidostilbene and Isopropyl Alcohol.

Diazidostilbene : (full safety data sheet available here)

- In case of inhalation, remove the person from the contaminated area. If breathing stops, perform rescue breathing.
- In case of skin contact, wash with soap and plenty of water.
- In case of eye contact, rinse eyes with water as a precaution.
- If swallowed, never give anything to an unconscious person. Rinse mouth with water.

Isopropyl alcohol : (full safety data sheet available here)

- Isopropyl alcohol can cause drowsiness and dizziness
- Keep away from sources of heat, flames and sparks. Do not smoke.
- Severely irritating to the eyes
- Contact a doctor in case of eye contact
- Handling must be done in a ventilated room

In a more general way, everything used for Carbon Transfer must be dedicated to this process.

2) STEPS AND SUPPLIES NEEDED

The practice of Carbon Transfer requires working in steps that we will detail. First of all, let's go over what is necessary at each step. The list may seem long.

Don't worry, everything will soon make sense to you. For each step, the materials needed and the consumables are listed.

a) Step 1: Preparing (sizing) the paper

- Plastic cutting board
- Ramekin or equivalent small container
- 1 fairly large spalter brush
- Demineralized water
- Liquitex matte varnish or PVA glue
- Watercolour paper

b) Step 2: Preparing the gelatine mixture ("the Glop")

Work in a room protected from direct sunlight (window panes / blackout curtains) and dimly lit (25 to 40W LED bulb)

- Plastic cutting board
- Ramekin or equivalent small container
- 250 ml. beaker / kitchen measuring glass
- 100 ml. beaker / table glass
- Glass stirrer / wooden chopstick
- 0.01 gram scale
- Water bath / Bottle warmer
- Small funnel
- Used pantyhose / coffee filter
- Kitchen thermometer
- Demineralised / deionised water
- Food grade pig gelatine 240° Bloom
- India ink (or other pigment source)
- Sugar
- Glycerine
- Diazidostilbene (DAS)

c) Step 3: Preparing the tissue

- Magnetic plate 35x35 cm. (for an A4 print)
- Perfectly flat base
- Spirit level
- Simple cutter
- 1 m. of magnetic tape 2 cm. wide and 2 mm. high
- Comb
- Fan
- A4 yupo / Polyethylene sheet (sheet for printing transparencies)

d) Step 4: Preparing the negative

- Laser or inkjet printer capable of printing transparencies
- Software capable of reversing a picture (creating a negative from a positive)
- A4 transparency sheets

e) Step 5: Exposing the tissue

- Printing frame / Basic A4 picture frame
- Exposure unit / Sun

f) Step 6: Transfer

- Tray / basin 35x35 cm.
- Worktop / Board 40x80 cm. across the bath
  - o Old oilcloth in case protection is necessary
  - o Thick synthetic glass plate / white aluminium 30x40 cm.
- Squeegee
- Very soft, wide brush (Hake type)
- Clothesline

3) STEP 1 – PREPARING (SIZING) THE PAPER

a) Introduction

Not all papers allow pigmented gelatine to adhere properly to their surface.

It is therefore necessary to prepare the paper by applying a layer to which the gelatine can adhere. This layer can be, for example, PVA glue (the white glue used at school, for example) or Liquitex matte varnish. There are of course many other ways to prepare the paper. *((note: several documents dealing with paper sizing can be found on the PICTO Benelux website)*

b) Preparing the paper

- In a ramekin, prepare a mixture of water and Liquitex in equal proportions. 5 g of each for a first layer on a paper that absorbs a lot (1 A4 sheet). A little less for the second layer. Add 1 g of isopropyl alcohol to accelerate the drying of the paper. Mix with a spalter.
- For PVA glue, the mixture is 4 g of glue for 6 g of water (to be adjusted according to the thickness of the glue) and 1 g of isopropyl alcohol for the first layer and a little less for the following layers. It may be necessary to do 3 layers with the PVA glue.
- In both cases, spread the mixture evenly over the surface of the paper with a spalter.
- Hold the brush fairly straight. Make sure that the coating is uniform over the entire sheet.
- Make sure to apply thin layers and not to leave any bubbles on the surface!
- Beware that Liquitex or PVA glue mixtures are often difficult to distinguish on the surface of the sheet.
- Allow the paper to dry thoroughly between each layer. It usually takes 1 to 2 hours to dry. Place the paper on a sheet of household paper or hang it on a clothesline to dry.

c) The paper is warped during the drying process..

The paper may become buckled (crooked) during the drying process. Place the prepared paper between sheets of blotting paper and place the sandwich under a thick book for 12 to 24 hours. The paper should return to its original flatness.

d) Cleaning

Clean all instruments with warm water and soap immediately after use.

4) STEP 2 - PREPARING THE GELATINE MIXTURE

a) Introduction

The recipe for the gelatine mixture is not standard. It changes according to the ingredients used, in particular the gelling power of the gelatine (Bloom index) and the type of pigments used. The original recipe is given for 100 ml of water in the mixture. A rule of 3 is used to calculate the correct dosages of the main ingredients according to the desired quantity. Glycerine is dosed in drops and therefore does not fall under the rule of 3. The same applies to isopropyl alcohol, whose action is not linked to a specific proportion.

The recipe is given in chapter #10.

Demineralised water(*)	45 ml	100 ml
Gelatine 240° Bloom	3,15 g	7,00 g
Sugar	1,80 g	4,00 g
Glycerine	-	-
Pigment	0,99 g	2,20 g
DAS	0,18 g	0,40 g
Isopropyl Alcohol	~1 ml	~1 ml

(*) *The terms "demineralised" and "deionised" are used interchangeably in this document.*

When preparing the tissue, the aim is to coat the surface of the initial substrate with approximately 1mm of emulsion.

You will find tables on page 25 to determine the thickness of a liquid in relation to the surface on which it is spread.

The easiest way is to use the volume of water in the recipe to quickly estimate the thickness of your tissue before drying.

b) Preparing the mixture for 100 ml of water

➢ In a 250 ml beaker, pour 7 g of gelatine into 90 ml. of demineralised water. The remaining 10 ml. will be used later in the recipe. Stir and let the mixture set for 30 minutes to allow the gelatine to swell and absorb all the water. After 30 minutes, the gelatine is a lumpy mass that has absorbed all the water in the beaker.

➢ Put the beaker in a water bath at 42°C and leave it there for at least 30 minutes. The gelatine will liquify. Some impurities may be visible in the beaker. The settling time is intended to reduce the presence of microbubbles in the mixture.

➢ Add 4 g of sugar and 2.2 g of pigments, stirring to dissolve the sugar and homogenise the solution.

- Leave in the water bath for 30 minutes. Remove the beaker from the water bath until the mixture gels, then return the beaker to the water bath for 10 minutes.

- Pour 1 cm. of hot water into a small ramekin.

- In a 100 ml. beaker, pour the 10 ml. of deionised water not yet used and 1 ml. of isopropyl alcohol. Place the beaker in the ramekin to temper the mixture.

- To complete the preparation of the emulsion, it is necessary to work in a room protected from the sun (window panes, blackout curtains) and with limited-intensity lighting (a white LED bulb of 25 to 40 W)

- Weigh 0.4 g of DAS and pour it into the slightly warmed up beaker. Stir until the DAS is completely dissolved in the water-alcohol mix. The liquid obtained takes on an orange colour. Pour the contents of the small beaker into the large one (which is still in the water bath). Stir.

- Filter the solution using a small funnel and a pantyhose as a filter. Use the small beaker as a destination vessel.

- The emulsion is ready to be coated on the initial substrate. The liquid is thick and remains fluid as long as it maintains its temperature.

c) About deionised water

The solution is prepared with deionised /demineralised water. You can of course buy it in a supermarket.
However, there are free sources of demineralised water!

Water from the condensation tray of a dehumidifier or from a portable air conditioner can be used to prepare this mixture.

However, deionised water can still be loaded with gases. These gases can cause microbubbles to appear in the emulsion.

It is possible to get rid of some of the gases trapped in the water by heating it for a few minutes in a pan. It is not necessary to boil for a long time. Turn off the heat as soon as the water comes to a full boil. As the water cools, it will continue to get rid of the trapped gases.

d) About gelatine

There are many different gelatines. They can be produced from plants or animals. Animal gelatines often have a slight tint. Each gelatine has its own gelling capacity, called the Bloom Index. The higher the index, the greater the gelling power. For carbon transfer, we look for a powdered gelatine with a Bloom index higher than 200, and with as little tinting as possible.

Pig gelatine is best suited to the needs of carbon transfer. Beef gelatine usually has a slight yellow tinge, which is visible and not very attractive.

It is easier to handle powdered gelatine. It is possible however to use gelatine in soft sheets as an alternative. This gelatine, often made from pork, is very transparent and has a sufficient Bloom index.

There are photographic quality gelatines. Thinner than food grade gelatines, certainly less tinted and with an excellent Bloom index, they will satisfy the most demanding of us.

e) About pigments

Pigments are certainly the most specific element for each carbon transfer artist. They come in countless forms and lead to significant differences in the final result.

For this recipe, the pigment is Nan King Indian ink from Lefranc & Bourgeois.

Indian ink is certainly the easiest source of pigment to start with. It is very affordable, easy to find and offers good results even for demanding people. It is easy to find small bottles with droppers that will make beginners happy. It has significant advantages:

- Wide range of sources and affordable prices
- Very even dispersion of pigments when correctly mixed
- Does not settle at the bottom of the solution during the rest phases of the recipe
- High quality rendering (grey range, maximum black density)
- Easy to use

However, the following points should not be overlooked when using it:

- Prefer fine Indian inks with a high pigment load
- Some inks can be quite greasy and might stain the paper
- Two bottles of ink, of the same brand, might lead to slightly different results. It may be necessary to adjust the recipe regularly

Some references :

- Speedball Super Black India Ink (might be difficult to source in France)
- Black Cat india ink (might be difficult to source in France)
- To be tested: Nan King intense extra fine by Lefranc & Bourgeois
- To be tested: À la Pagode by Sennelier

Watercolours in tubes seem to be an easy source of pigments for carbon transfer. They are very easy to find. The quality of these paints cannot be denied. The results obtained can be interesting. However, quality watercolours in tubes can quickly become expensive. Advantages of these pigments :

- Can be sourced quite easily
- Quality rendering (range of greys, maximum black density)
- A wide range of different pigments to choose from is avaikable, allowing you to find the one that suits best your needs.

However, the following points should not be overlooked when using watercolour from a tube :

- Not very easy to handle when preparing small quantities of emulsion
- Tendency to settle quickly to the bottom of the beaker during the rest phases of the recipe
- Mixing is not always easy

Reference :

- Lamp Black by Winsor & Newton

The most demanding among us will want to create their own mixes from scratch, using dry pigments. The result is potentially as good as the work involved. While there is no doubt about the qualitative advantages of this method, they might not be the most suitable for beginners, for those who want to start out right away, convinced that they can achieve something!

There are many other sources of water-based pigments. As I have not had the opportunity to test them, I will not go into detail on the subject.

f) About sugar and glycerine

Sugar and glycerine are humectants. They help to keep the gelatine as soft as possible during and after drying. The proportion of sugar and glycerine will therefore vary according to the humidity at the time of the recipe's preparation.

The notion of humidity is very relative and difficult to evaluate in the absence of a measuring instrument! The following points should help you to better appreciate this notion.

I live in a flat that is heated by my city's hot water system.
As is often the case, the heating of the building can be a bit excessive. During autumn and winter, it is warm and dry in my house. In early spring or autumn, when the heating is turned off (or not yet on), there are days when the dampness and coolness pierce your bones. The laundry doesn't dry. The humidity is really high. During the nice days of spring, the mildness invites you to live with all the windows open. Humidity varies between day and night but is often moderate.

In any case, you should adapt these notions to your environment or better, invest in a thermometer/hygrometer.

g) About isopropyl alcohol

Isopropyl alcohol is intended to prevent the formation of microbubbles in the emulsion. These bubbles come from gases present even in deionised water and/or possibly from mixing too vigorously.

h) Cleaning

All the equipment can be easily cleaned with hot water and soap.

5) STEP 3 – PREPARING THE TISSUE

a) Introduction

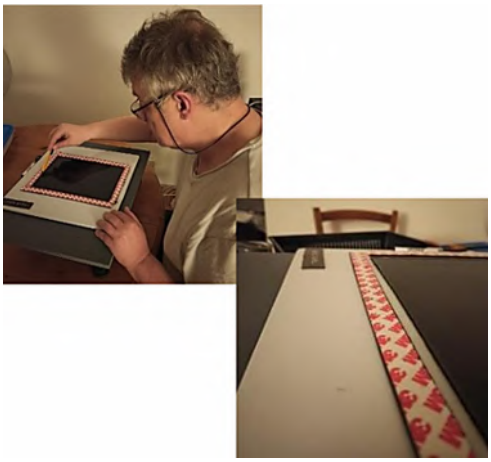
The preparation of the tissue is one of the easy steps. The only thing that is a bit tricky is to spread the mixture on a perfectly horizontal plane so that the mixture is evenly distributed over the entire surface of the initial support.

b) Preparing the tissue

- The first part of the preparation should be done during the last settling period of the mixture (before adding the DAS). It can therefore be carried out under normal lighting conditions.
- Place the magnetic plate on a perfectly horizontal surface.
- Place the initial support on the magnetic plate.
- Wipe the initial support with a clean cloth and a 70% isopropyl alcohol solution to remove any traces. The support must lie perfectly flat on the magnetic plate (no deformation or other air bubbles between the magnetic plate and the support). Allow the support to dry completely.
- Place the magnetic strips along the inner edges of the initial support to form a "pool".
- As with the final preparation of the emulsion, the coating should be done in a room protected from direct sunlight and lit only with a convenience lighting of moderate intensity.
- Empty the beaker of emulsion into the "pool". Using the comb, spread it over the entire surface delimited by the magnetic strips (until it touches their edges). Make sure that no large bubble remains, especially at the edges.
- Leave the plate in place for at least half an hour. If necessary, cover it with a basin to keep the tissue out of the light. This will allow the material to gel. It will then be possible to handle the magnetic plate without danger of spilling!
- Remove the basin protecting the tissue

- Using a simple cutter, cut the gelatine along the edges of the "pool". No heavy pressure is required to cut the gelatine. Carefully remove the magnetic strips (take care not to take away the gelatine still stuck to the magnetic strip) and put them a few millimetres away from the gelatine, keeping the initial support pressed against the magnetic plate.

- Place the magnetic plate in an unlit, and preferably ventilated room. Allow to dry for 12 to 24 hours (more if necessary). If necessary, drying can be accelerated with a fan.



c) About the initial support

The initial support can be of any type, "plasticized" or not, on the surface of which the gelatine adheres superficially (without penetrating in depth) and can be removed later on, during the final transfer.

Yupo is a kind of synthetic polypropylene paper that is often used as initial support. It might be a bit difficult to find in France, but has the advantage of being reusable. It is a material that is very flexible and easily crumpled. It is quite possible to glue a transparency sheet on a piece of yupo to give it the rigidity needed for easy reuse.

It is also possible to use polyethylene sheets such as printer transparency sheets.

The initial support has a limited life span and has no real influence on the final result provided it is properly removed from the gelatine in the last step. Therefore, the cheapest one possible should be chosen for this function.

d) About drying the tissue

Dry gelatine is easy to recognize:

- The surface remains very smooth but less shiny than when it was coated.
- The surface does not feel fresh when touched with the finger.
- The surface does not feel as if it wants to stick to your finger.
- The thickness of the surface is now barely that of an ordinary sheet of paper.

The carbon tissue can be dried horizontally or vertically once the gelatine has set. Hanging from a clothesline, the tissue will tend to curl up. This will make the transfer of the gelatine to the final support a little more difficult, but not impossible.

e) About horizontality

If necessary, use a spirit level to check that the surface is level. This check has to be done on the length, the width as well as on the two diagonals to make sure that the level is correct.

If the surface is not perfectly level, the mixture will not be distributed evenly over the initial support.

One part of the resulting coat will be lighter than the other.

It may be necessary to make a tripod board in order to easily achieve horizontality. A rigid board and 3 adjustable furniture legs can do the trick. Remember that the smaller the surface area of each leg, the easier the leveling will be.

f) What could go wrong at this stage?

A well-made coating should :

- Have a very smooth, bubble-free surface.
- Be relatively shiny.
- Be uniformly black over the entire surface of the initial support.

The density of the black is not uniform on the initial support:

- The emulsion may not have been homogeneous (this can occur when using watercolour from tubes). Make sure to mix well at the different stages of the preparation, while using smooth and even strokes.
- The magnetic plate is not placed on a perfectly horizontal surface.
- The initial support is not laying perfectly flat on the magnetic plate (it is blistering).

There are bubbles in the emulsion :

- If the bubbles are against the edges of the "pool", this is not a problem. It is possible to remove them with the comb and spread the mixture well on the concerned area.
- If the bubbles are fine and spread all over the surface, it is likely that the mixing was too vigorous during the making.

The emulsion does not stay on a specific area of the temporary support:

- It is likely that the support was still wet or dirty insome areas when the emulsion was coated.

The mixture leaks out and gets on the magnetic plate:

- The plate should not be raised to ease the distribution of the emulsion: the edges of the "pool" are barely higher than the level of the mixture. The idea is tempting, but not so good after all!
- The magnetic strips that delimit the pool are not tightly fitted: the pool leaks...

g) Cleaning

All the equipment can be cleaned easily with warm water and soap.

6) STEP 4 - PREPARING THE NEGATIVE

a) Introduction

Creating a negative from a picture is not very complicated. What can be complicated is finding an inkjet (or possibly laser) printer capable of printing transparencies with good quality and finding the transparency sheets! In addition, the impact of the quality of the negative should not be overlooked! The quality of the inks/toners used will influence the printing of the negative. The negative will therefore filter UV rays more or less well during the exposure stage. The final quality of your print depends greatly on this stage!

If it needs to be clarified: during the exposure phase, the negative is placed directly in contact with the surface of the tissue. The negative must therefore be the size of the print you want to obtain! This is why we will limit ourselves to the A4 format to begin with.

This article is limited to the creation of a negative from a digital picture.

b) Preparing a negative from a digital picture

- First of all, open the picture in an image editing software and if it is not already the case, convert it to greyscale.
- Invert the image to make a negative
- Then resize the image to the desired format of the final print, using the same resolution as the printer.
- Save the picture and print the transparency

c) What software?

There are several software programs that can be used to carry out these steps:

- LightRoom + Photoshop
- Gimp
- Affinity Photo
- Photoshop Express
- .../...

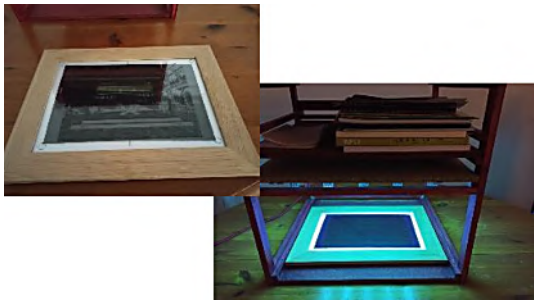
7) STEP 5 – EXPOSING THE TISSUE

a) Introduction

If up to now the work done was somewhat similar to following a kitchen recipe, this step is the first one that introduces a bit of magic. By bringing the tissue into contact with a negative printed on a transparency, we are going to imprint the picture in the gelatine This print will be visible in the gelatine. This will require a source of UV light, natural or other!

To use the sun as a source of UV light, it is best to be in spring or summer!

b) Exposing the tissue



- Place the negative, then the tissue (gelatine against the negative) in the printing frame.
- Place the printing frame in the exposure unit.
- Turn on the exposure unit for the time specified for your equipment

c) Lamp or LED exposure unit?

It is easy to build a lamp or LED exposure unit, even on a coffee table, as long as the size is reasonable (accepting up to A3 paper). As for the investment, it remains just as moderate. The choice is between using neon tubes or LEDs to make this unit.

Neon tubes have the advantage of emitting UV light as close as possible to the wavelength that allows the DAS to harden the gelatine. This is a guarantee of efficiency.

The UV LED strips that are readily available are slightly less effective for DAS, but still provide good results.

Chapter #12 details the design of a neon tube exposure unit and gives the basics of a LED strips unit.

d) The printing frame

The purpose of the printing frame is to keep the negative in contact with the tissue during exposure.

The print may lack some sharpness, or even appear blurred if the negative is not well in contact with the tissue!

A printing frame can be improvised from an entry-level picture frame bought in a DIY shop. The limitation of this equipment is due to the small metal tabs that hold the back board against the tissue. They tend to break after a few dozen manipulations. However, this solution remains a good way to start with a limited budget.

e) Using the sun?

This question didn't even come to mind in the 19th century! The sun was the only possible way to obtain the hardening reaction of the gelatine with potassium dichromate. The mechanism is identical with DAS except for the choice of a slightly different chemical, because of the toxicity of dichromates.

It is important to remember that gelatine liquifies at 42°C and above. It is therefore a bad idea to install the printing frame in direct sunlight. The best choice seems to be a northern exposure during a very bright day.

It should not be overlooked that UV rays are much less prevalent in autumn and winter.

f) Exposure time

The exposure time depends exclusively on the quality and quantity of the UV light provided by the source used. In general, 3 to 10 minutes with an exposure unit. With sunlight, it can be more difficult to judge the exposure time.

When the exposure is sufficient, a "ghost" of the image appears on the surface of the gelatine.

If the exposure time is too long, microbubbles will form on the surface of the print during transfer to the final support.

If the exposure is too short, the gelatine does not adhere to the final support.

8) STEP 6 – CARBON TRANSFER

a) Introduction

This is the last step: transfering the hardened gelatine after exposure to the final support and cleaning up the unhardened gelatine. This is the most delicate part of the process. Even hardened gelatine is very fragile. It is ridiculously thin. In comparison, the ordinary sheets of paper used in a printer seem particularly thick.

If the previous steps could be done in any room, even one not dedicated to Carbon Transfer, this last step requires working at least in a bathroom and having a suitable work surface (a 40x80 cm. surface seems adequate to handle A4 sheets). A board placed across a bathtub may be OK, even if it is less comfortable to work on. It will accomodate the tray in which the tissue and the final support will be soaked.

b) Transfer

- Fill the tray with water at room temperature (18 to 20°C).
- Soak the tissue in the water for thirty to forty seconds. Slide the sheet into the water holding it almost horizontally. Make sure that the tissue is completely immersed. Gently sweep the surface of the gelatine with a soft brush to avoid the formation of microbubbles on the surface.
- Remove the tissue and lay it flat on the work surface, gelatine side up.
- Pass the squeegee over the gelatine to remove the water remaining on the surface. Press firmly but not excessively so as not to damage the gelatine.
- Suspend the tissue while you prepare the final support.
- Clean / wipe the work surface to avoid smudging the final support.
- Soak the final support for 5 to 10 seconds in water. As with the tissue, insert the sheet at the slightest angle with the prepared side up. Ensure that the entire sheet is immersed. Gently sweep the surface with a soft brush to prevent microbubbles from forming on the surface.
- Remove the final support from the bath and place it on the work surface, prepared side up.
- Squeegee to remove any remaining water from the surface. Apply moderate pressure only (less than for the tissue).
- Place the tissue on the final support (gelatine facing the support!). Hold the sandwich firmly and run the squeegee over the tissue to force the contact between the gelatine and the final support. Run the squeegee along the length and width of the sandwich to ensure good contact.
- Hang the sandwich by 2 corners so that it is vertical and preserves the contact between the gelatine and the final support.
- Clean the work surface and replace the water in the tray with water at 42 / 45°C.

- When the new bath is ready, place the sandwich in the water, final support side down. Keep the support completely immersed by sweeping the soft brush over the entire surface of the sandwich.
- After 2 to 3 minutes, the gelatine that was not hardened during the exposure should start to liquify. Pigments migrate into the water.
- It is time to separate the initial support from the final support!
- Gently lift the initial support by its short side while holding the final support with the other hand. The separation between the two supports should be achieved without forcing. The gelatine should stick to the final support.
- Place the temporary support in the sink until the final support is cleaned.
- Turn the final support over in the water (gelatine side down) and leave it for a few minutes. Use the soft brush to keep the support well immersed. Use your hands to move the final support back and forth to speed up the separation of the uncured gelatine.
- Remove the final support from the bath and place it on the work surface while the tray is being emptied and rinsed. Fill the tray with fresh water.
- Rinse the final support in fresh water to remove any pigment deposits that might remain on the surface of the gelatine.
- Hang the final support by 2 corners.
- Allow to dry.

Rather than trying to make pictures to illustrate this step, it is certainly more interesting to let Franck Rondot show how he works.
The transfer part is shown at 07:45 :
https://www.franck-rondot.com/blog-photographe/385-tirage-charbon-simple-transfert-au-diazidostilbene-das-des-pigments-au-tirage.html

c) It worked, but...

The first thing to remember is simple: it works! Congratulations!

The print is not really black, it is more like sepia, green.....

- This can happen with some pigments. For example, diluted India ink may not be perfectly grey. The type and quality of the pigments used is responsible for this colour shift

The print is too light, too dark, too contrasty, or not enough...

- It's now all about the emulsion recipe, the type of paper, the quality of the paper preparation! That's where the adventure becomes really interesting...

  See paragraph #9.b for more information.

After a couple of days, the print becomes significantly yellowed or has yellow spots:

- The paper used for the final support was poorly prepared. During the transfer, some of the DAS still present in the gelatine was absorbed by the paper. With repeated – although weak – exposure to the UV rays present, the DAS takes on this dark yellow tint.

d) What could go wrong at this stage?

This last stage is of course the most delicate. Think, for example, of the gelatine's fragility during handling and the tolerance of the paper to immersion, which can vary greatly from one paper to another...

The separation of the temporary support is difficult, requires forcing:

- The bath is not hot enough to melt the gelatine properly.
- The immersion in the bath was not long enough.
- The initial support is not suitable for the process. It retains the gelatine too strongly.

The separation from the initial support went well, but excess gelatine remains on the final support:

- The bath is not hot enough to melt the gelatin properly.
- It is possible to add hot water to the tray, but too long an immersion may have harmful consequences (melting of gelatine that should remain on the final support).
- It is possible, to a certain extent, to use a soft brush to help the excess gelatine to come off. This is a delicate operation as it can damage the gelatine that should remain with the final support. However, it is interesting to try this method at a beginning stage in order to understand what the result could have been, and to reassure oneself about the work at previous stages.

The gelatine does not stay on the final support:

- The bath water was too hot and/or the immersion too long. The gelatine, even hardened, remains fragile and did not withstand the processing.
- The preparation of the final support was not good.
- The final support was immersed too much in the cold bath and became too waterlogged.

Microbubbles appear on the surface of the final support:

- The mixture was prepared too roughly. The demineralised water was too full of gas. Microbubbles formed and were trapped in the dried gelatine.
- The exposure was too long. During the tissue's soaking, a chemical reaction is triggered, generating gas.

9) SOME FOOD FOR TOUGHT

a) The right chemistry

The Carbon Transfer process requires quite a lot of patience before finding all the right settings, the right moves. This is why this document does not present a miracle recipe that would make the reader the next master of pigmented gelatine!

It is therefore advisable to work without rushing, with simple objectives for each test undertaken. Moreover, even before wondering about the next step, it might be appropriate to first ask yourself whether this process is compatible with your living environment! Ideally, of course, having a dedicated room with a sink is a given. However, desires sometimes can come up against a very different reality. My experience shows nevertheless that with a few concessions, it is possible to have the work done for some part in the living room and for the remaining in the bathroom.

It is likely that your early days of carbon transfer will be like a long list of failures or semi-failures. In other words, you will waste paper and pigments. Avoid investing in high quality paper from the beginning. Stick to moderate weights (180 to 200 g/m2), prefer fine or even very fine grain paper, which allows you to better appreciate the gelatine rendering. Indian ink is affordable. A small bottle equipped with a dropper is very practical for measuring.

If you have a dehumidifier or air conditioner, use it to provide you with demineralised water. Water from the condensation tray of a tumble dryer may still contain traces of detergent. It may therefore not be suitable for this process.

Getting started guarantees that you will have to do a lot of tests in all directions. There is no need to rush into the making of a litre of emulsion and preparing a lot of tissues, considering that you will very likely have to change the concentration of pigment, DAS, gelatine, etc. Prepare one or two tissues at a time. There is no need to make more at a time.

b) Gelatine, pigments, DAS, blacks & greyscale

There is a lot of literature in English about Carbon Transfer using potassium dichromate to harden gelatine with exposure under UV light. With dichromate, the suitable concentration range is quite large; the concentration has a direct effect on the black and grey levels. In addition, the exposure time also has a significant impact on the thickness of the hardened gelatine and thus on the blacks and the tonal scale.

DAS, used in Europe since the ban on dichromates, works a little differently. The thickness of gelatine hardened by DAS varies very little with the exposure time. However, if the exposure time is too long, gases will be created that cause microbubbles to form during the gelatine transfer stage. The control of the density of blacks and greyscales is linked to the following elements:

- The quantity of pigments used
  > Increasing the quantity is a way to increase the density of the blacks
- The proportion of DAS in relation to gelatine.
  > Increasing the proportion of DAS fosters softer contrasts
- The proportion of gelatine in the water
  > Density increases with the proportion of gelatine
- To a certain extent, the thickness of the gelatin spread on the initial support
  > Thickness favours the density of the blacks

Start with a thickness of about 1mm. of mixture on the initial support. This thickness can be adjusted between 0.8 and 1.2 mm.

Start with a mixture of 8 g of gelatine per 100g of water. This proportion can be adjusted from 6 to 10 g for the same amount of water.

Start with a DAS / gelatine ratio of 0.05 (0.4 g DAS for 8 g gelatine). This ratio can be adjusted from 0.04 to 0.06.

Start with 3 g of Indian ink. The quantity of Indian ink can be adjusted from 2 to 4 g per 100 g of water.

10) RECIPE

The 3 tables below show the recipe for different levels of perceived humidity.

Humid to very humid

Water	45 ml 35+10 ml	50 ml 40+10	55 ml 45+10	60 ml 50+10	65 ml 50+15	70 ml 55+10	75 ml 60+15	80 ml 65+15	85 ml 70+15	90 ml 75+15	95 ml 75+20	100 ml 80+20
Gelatine 240° Bloom	3,60 g	4,00 g	4,40 g	4,80 g	5,20 g	5,60 g	6,00 g	6,40 g	6,80 g	7,20 g	7,60 g	8,00 g
Sugar	0,68 g	0,75 g	0,83 g	0,90 g	0,98 g	1,05 g	1,13 g	1,20 g	1,28 g	1,35 g	1,43 g	1,50 g
Glycerine	-	-	-	-	-	-	-	-	-	-	-	-
Pigment	1,13 g	1,25 g	1,38 g	1,50 g	1,63 g	1,75 g	1,88 g	2,00 g	2,13 g	2,25 g	2,38 g	2,50 g
DAS	0,18 g	0,20 g	0,22 g	0,24 g	0,26 g	0,28 g	0,30 g	0,32 g	0,34 g	0,36 g	0,38 g	0,40 g
Isopropyl Alcohol	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml

Low to medium humidity

Water	45 ml 35+10 ml	50 ml 40+10	55 ml 45+10	60 ml 50+10	65 ml 50+15	70 ml 55+10	75 ml 60+15	80 ml 65+15	85 ml 70+15	90 ml 75+15	95 ml 75+20	100 ml 80+20
Gelatine 240° Bloom	3,60 g	4,00 g	4,40 g	4,80 g	5,20 g	5,60 g	6,00 g	6,40 g	6,80 g	7,20 g	7,60 g	8,00 g
Sugar	1,80 g	2,00 g	2,20 g	2,40 g	2,60 g	2,80 g	3,00 g	3,20 g	3,40 g	3,60 g	3,80 g	4,00 g
Glycerine	-	-	-	-	-	-	-	-	-	-	-	-
Pigment	1,13 g	1,25 g	1,38 g	1,50 g	1,63 g	1,75 g	1,88 g	2,00 g	2,13 g	2,25 g	2,38 g	2,50 g
DAS	0,18 g	0,20 g	0,22 g	0,24 g	0,26 g	0,28 g	0,30 g	0,32 g	0,34 g	0,36 g	0,38 g	0,40 g
Isopropyl Alcohol	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml

Dry to very dry

Water	45 ml 35+10 ml	50 ml 40+10	55 ml 45+10	60 ml 50+10	65 ml 50+15	70 ml 55+10	75 ml 60+15	80 ml 65+15	85 ml 70+15	90 ml 75+15	95 ml 75+20	100 ml 80+20
Gelatine 240° Bloom	3,60 g	4,00 g	4,40 g	4,80 g	5,20 g	5,60 g	6,00 g	6,40 g	6,80 g	7,20 g	7,60 g	8,00 g
Sugar	1,80 g	2,00 g	2,20 g	2,40 g	2,60 g	2,80 g	3,00 g	3,20 g	3,40 g	3,60 g	3,80 g	4,00 g
Glycerine	3 drops	3 drops	3 drops	3 drops	3 drops	3 drops	4 drops	4 drops	4 drops	4 drops	4 drops	4 drops
Pigment	1,13 g	1,25 g	1,38 g	1,50 g	1,63 g	1,75 g	1,88 g	2,00 g	2,13 g	2,25 g	2,38 g	2,50 g
DAS	0,18 g	0,20 g	0,22 g	0,24 g	0,26 g	0,28 g	0,30 g	0,32 g	0,34 g	0,36 g	0,38 g	0,40 g
Isopropyl Alcohol	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml	~1 ml

The original recipe is provided by Sandy King in the forum https://groups.io/g/carbon/topics.

11) CALCULATING THE THICKNESS OF THE LAYER

The tables below can be used to estimate the thickness of the layer on the temporary support as a function of the volume of the mixture used and the size of the support. Be careful not to limit the estimation of the mixture's volume to the quantity of water it contains. The gelatine swells as it absorbs the water and visibly contributes to the volume of the solution.

Length	150 mm	200 mm	250 mm	300 mm	350 mm	400 mm
Width	100 mm	133 mm	167 mm	200 mm	233 mm	267 mm
Mixture Volume	15 ml	25 ml	40 ml	60 ml	80 ml	105 ml
Thickness	1,00 mm	0,94 mm	0,96 mm	1,00 mm	0,98 mm	0,98 mm

Length	150 mm	200 mm	250 mm	300 mm	350 mm	400 mm
Width	113 mm	150 mm	188 mm	225mm	263 mm	300 mm
Mixture Volume	15 ml	30 ml	45 ml	65 ml	90 ml	120 ml
Thickness	0,89 mm	1,00 mm	0,96 mm	0,96 mm	0,98 mm	1,00 mm

Length	100 mm	150 mm	200 mm	250 mm	300 mm	350 mm
Width	100 mm	150 mm	200 mm	250 mm	300 mm	350 mm
Mixture Volume	10 ml	20 ml	40 ml	60 ml	90 ml	120 ml
Thickness	1,00 mm	0,89 mm	1,00 mm	0,96 mm	1,00 mm	0,98 mm

In general, for dimensions in millimetres and volume in millilitres, the formula to be used is Thickness = (Volume x 1000) / (Length x Width).

12) TINKERING WITH TWO LEFT HANDS

a) Introduction

Not everyone has a space devoted to tinkering, nor the passion or talent to make all the little things that can be necessary for the practice of Carbon Transfer. The works presented in this chapter are intended to be accessible to everyone.

b) Horizontal work surface

It is easy to work on any table to prepare your final support or pigmented gelatine emulsion. However, spreading the emulsion on the initial support requires being on a horizontal plane: not slightly inclined, strictly horizontal!

Equipment needed :

- Electric or manual screwdriver
- Spirit level (less than 10 €)
  - ✔ A simple 30cm long model should be perfectly suitable if you have to buy one
- Pre-cut composite fibre board 40x80 cm. and 15 mm. thick (less than 10 €)
  - ✔ Ask the DIY shop to cut it into 2 panels of 40x50 cm. and 40x30 cm.
  - ✔ Be careful with the length of the screws for the furniture legs if the panel is 10 mm. thick!
  - ✔ Colour doesn't matter
  - ✔ The cost is similar for either wood, plywood or MDF
  - ✔ Surface should be smooth and clean, avoiding the need for painting / varnishing
- 4 adjustable furniture legs (less than 10 €)
  - ✔ The smaller the floor area of those legs, the easier it will be to adjust the horizontal position of the worktop
  - ✔ Only 3 legs will be used to simplify the adjustment
- Magnetic plate in brushed metal 40x50 cm. (less than 10 €)
  - ✔ Optional if you don't already have a magnetic plate / board
  - ✔ Check that the magnetic plate is supplied with double-sided stickers

Assembly :

- Use the 40x50 cm. panel
  - ✔ Allows to prepare up to 2 tissues simultaneously
- Screw 2 feet onto the board at the corners of one edge
- Screw the 3rd foot in the middle of the opposite edge
- Clean the surface of the worktop
- Glue the magnetic plate

The illustrated model uses feet with a fairly wide base, which does not allow to correct large sloping defects.

c) Printing frame

A poor man's printing frame can be a simple A4 photo frame bought in a DIY shop. The investment is affordable (less than 10€) and is perfectly suited to press the tissue against the negative. The cheap glass used for the picture frame does not filter UV light, which is perfect.

There are however 2 limitations to the picture frame option:

- The photo blocking system is simple and not very efficient for our needs. The wooden panel used to press the negative and the tissue against the glass plate is flexible and therefore does not guarantee optimum pressure.
- The small metal lugs used to press the panel are fragile and will eventually break.

There are small metal screw-on lugs that allow the rear panel to be pressed more firmly against the frame (about 3 € for 4 "screw-on turning lugs"). Be careful with the size of the screws in relation to the thickness of the picture frame used!

You can also find A4 aluminium panels which will give the necessary rigidity to press the pad against the negative (about 5 € for a 3mm. thick A4 panel).

d) Fluorescent tube exposure unit

The making of an exposure unit is the most complicated part for those who have no real experience. It requires a bit of DIY equipment and a little more than a day's work (including the time needed to dry the glue and paint).

The principle is, firstly, to install the tubes on a 40x40cm. panel and then to make a frame in which to insert the panel supporting the tubes. It is of course possible to do something better, more beautiful, more efficient. The advantage of this DIY is that it is simple to describe and to make. The cutting is limited to wood strips and is done with a cutting box.

It is also possible to partially reuse an existing box if it is high enough and to cut out the necessary space on the top to place the fluorescent tubes.

There is no bad solution. Aesthetics become secondary if you can achieve your goals.

MATÉRIAL NEEDED

To borrow if necessary :

- Drill + 10mm wood drill bit
- Electric / manual screwdriver
- Cutting box
- Wood saw
- 50 cm. flat metal ruler
- Adjustable frame clamp
  - ✔ Not really essential but certainly a source of comfort and clean work
- Used oilcloth for protection
  - ✔ Might be a 45x60 cm. cutting board
- Stripping pliers

Matérial :

- Neoprene glue
- 15 mm. nails
- 3,5x30 mm. wood screws
- 3x12 mm. wood screws
- Two 8-way (or 3 and 5 way) mini lever wire connectors (Cage clamp) for flexible and rigid cable (Wago type)
- Electric wire 1,5 mm.
- 2 m. cord and switch (for lamp)

- 2 panels 40x80 cm. to be cut into panels of 40x40 cm.
- Wood strip 13x 27 mm. (3,20 m.)
- Wood strip13x13 mm. (4,00 m.)
- 1 sheet of fine sandpaper

- 5 Actinic 15W /10 UVA PHILIPS fluorescent tubes (G5 bases)
- 10 130°C G5 T5 socket with clip-on foot
- 5 PHILIPS Electronic Ballasts T8=1x14/15/18w T5=24w T5C=22w L=1x18/24w F=1x18/24w
  - ✔ Prefer electronic ballasts to analogue models which also require the use of starters (the price difference remains reasonable)

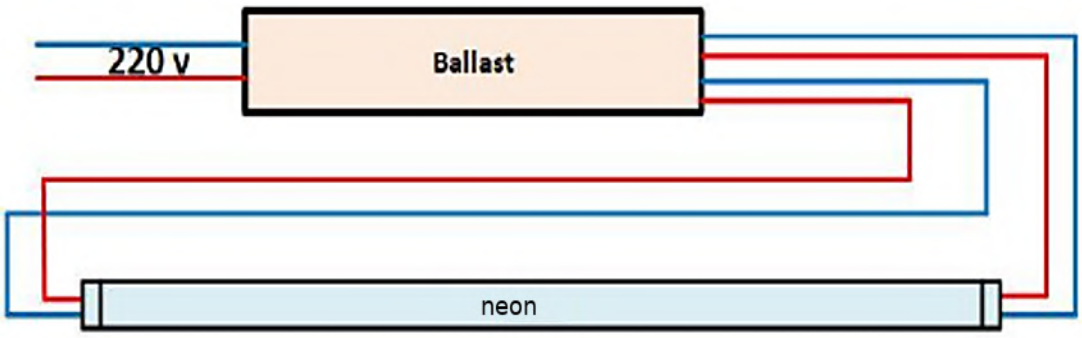
Cost estimates

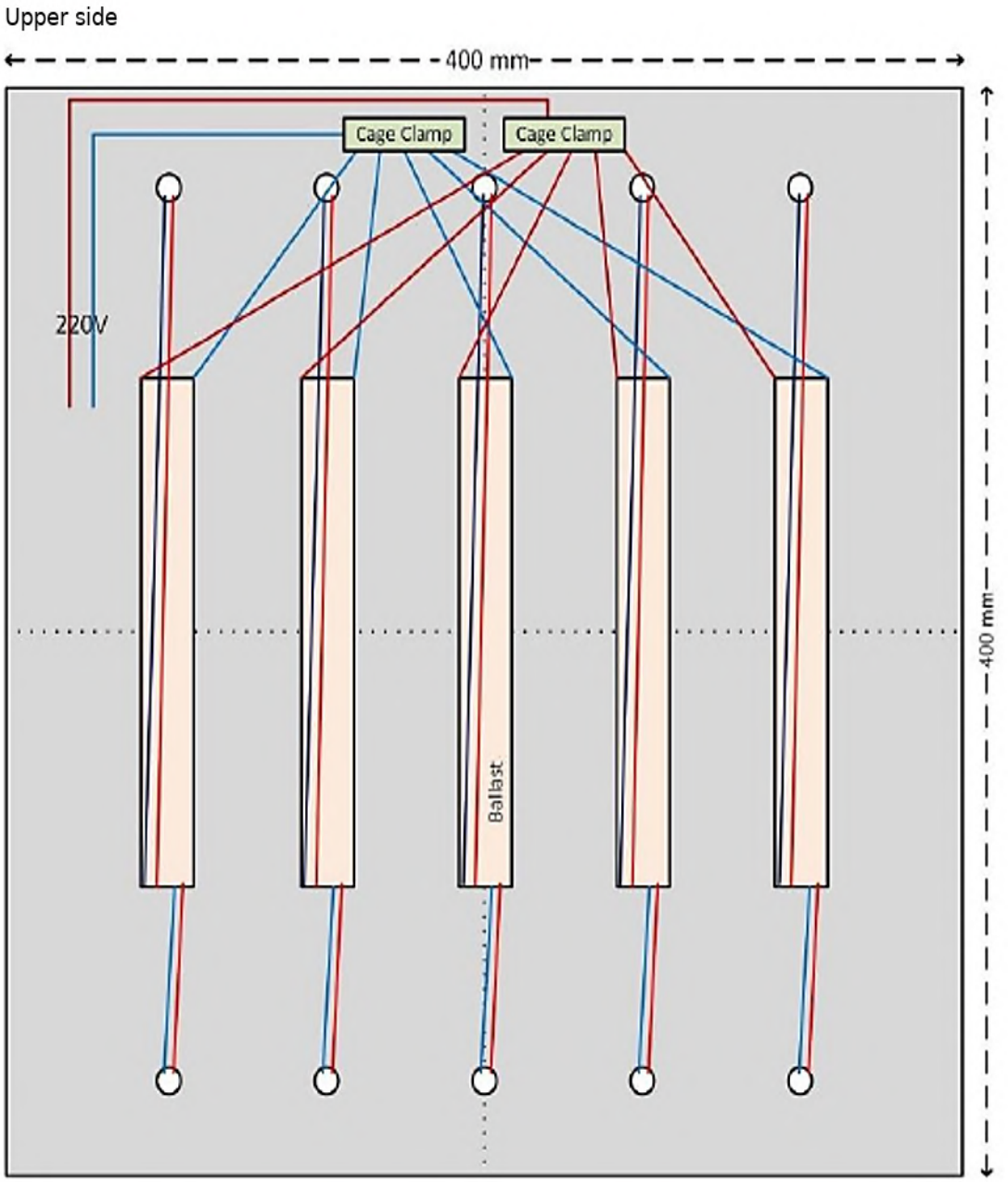
- Fluorescent tubes, sockets and ballasts : 60 €
  - ✔ It is possible to optimise the cost by choosing a cheaper brand than Philips
- Wood : 30 €
- Small materials (neoprene glue, electricity, screws and bolts) : 30 €

EXPOSURE PLATE

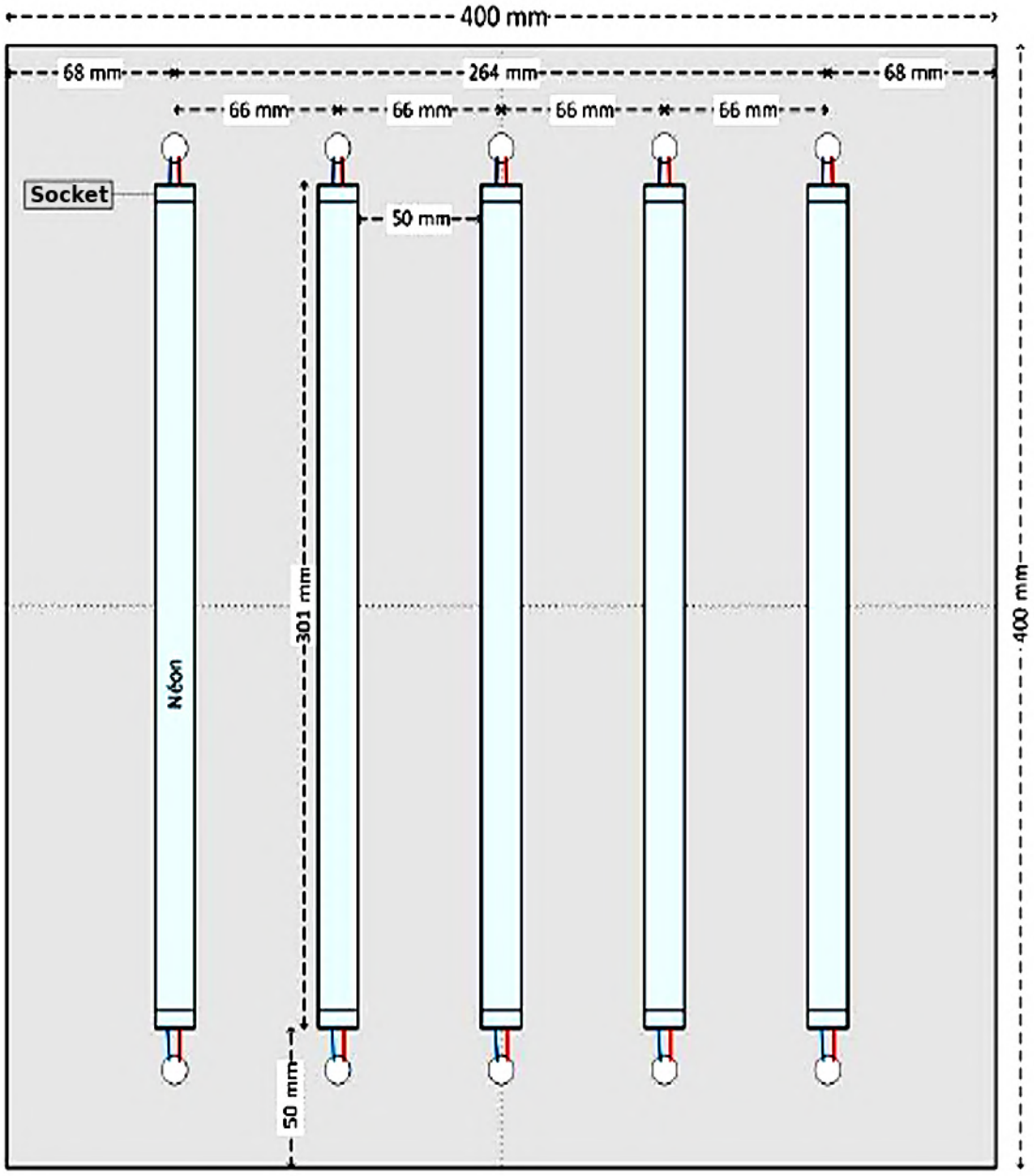
The exposure plate is a 40x40 cm. panel on which the ballasts and the electrical part will be placed on one side, and the fluorescent tubes on the reverse one.

CONNECTION CHART: FLUORESCENT TUBES TO BALLASTS





Bottom side

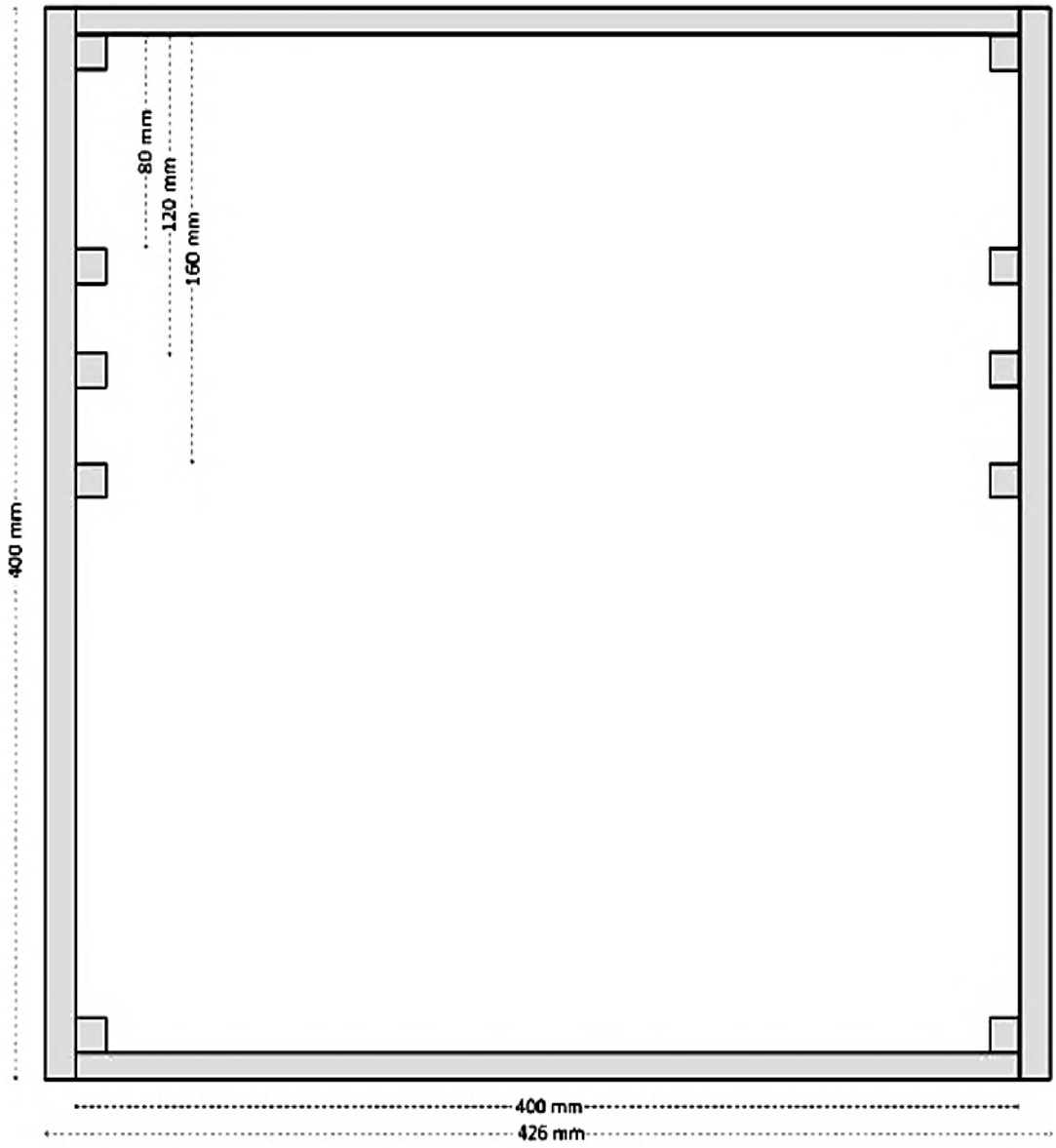


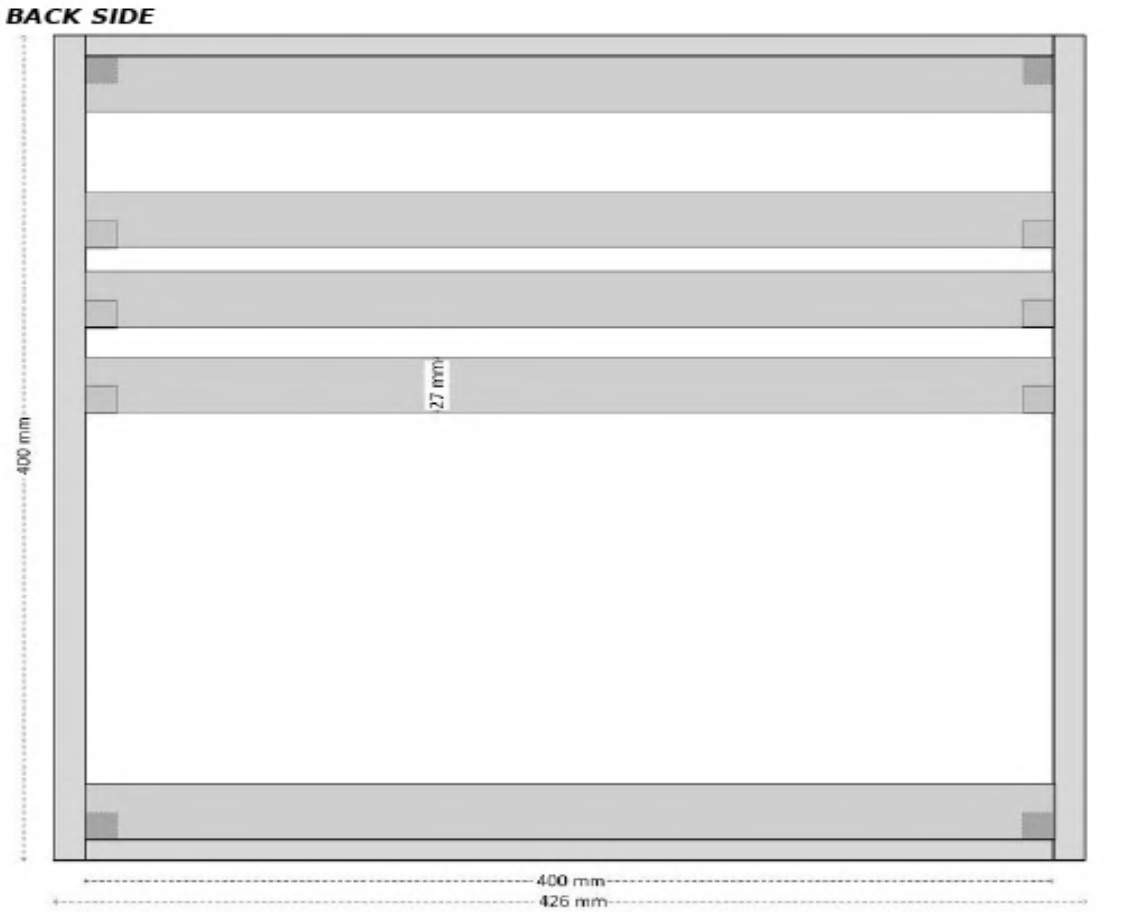
ASSEMBLY INSTRUCTIONS

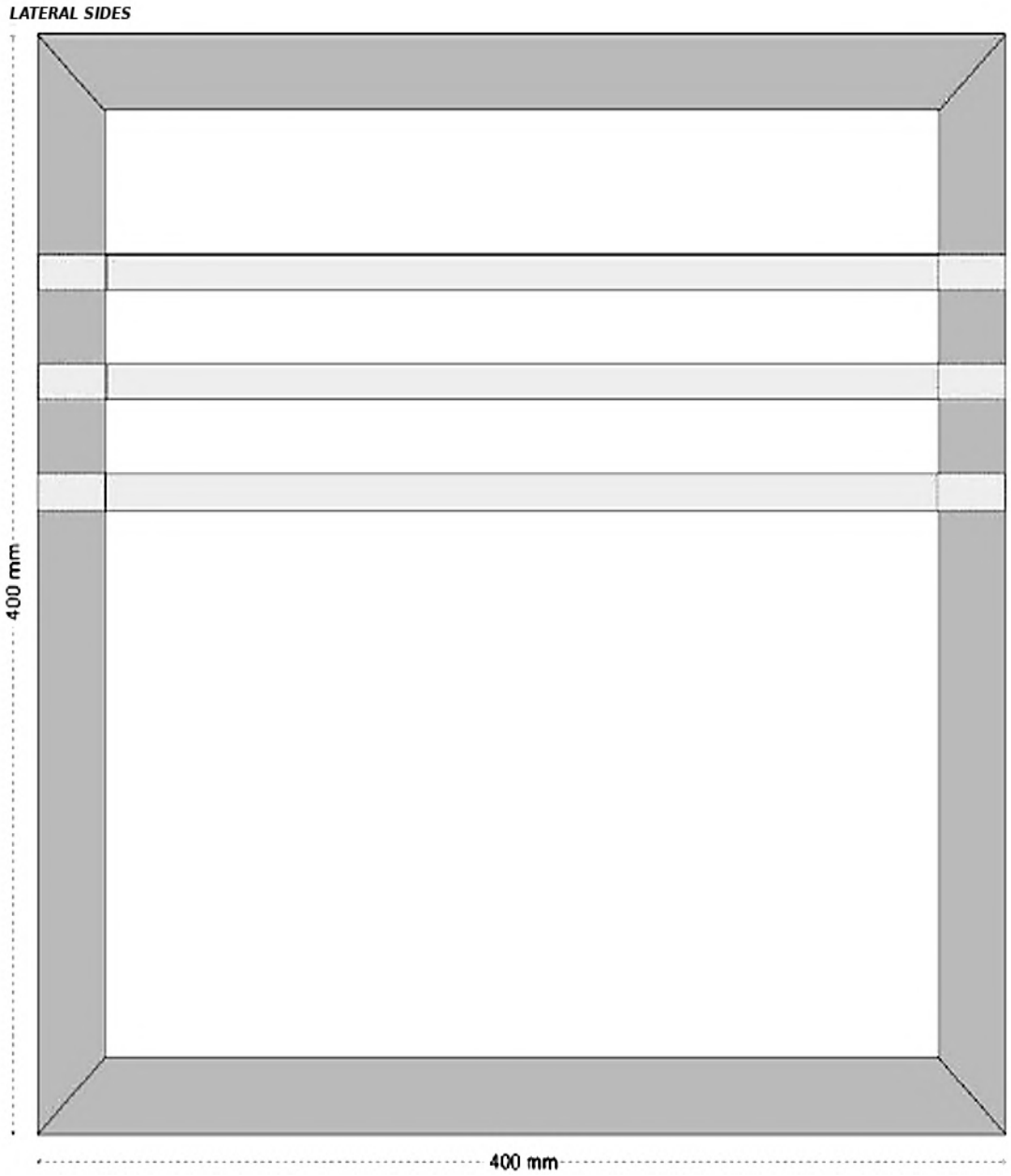
- On the bottom side of the 40x40 cm. panel
  - Mark with a ruler and a pencil the location of the fluorescent tubes and the G5 sockets:
    - ✔ Draw lines to determine the middle of the tubes on their length
    - ✔ Draw lines to determine the position of the sockets
  - Mark 10 points at 3 cm. in the axis of the 5 fluorescent tubes
  - Drill the 10 identified holes with a 10 mm. drill bit
  - Mark the position of the screws for the sockets of the 5 fluorescent tubes with a pin
    - ✔ As a precaution, test the installation of a pair of sockets and the tube by moving to the edges of the board to validate the measurements
- On the upper side of the 40x40 cm. panel
  - Mark the location of the ballasts with a ruler and a pencil
  - Mark with a pin the position to screw the 5 ballasts on the board
- Clean the panel with fine sandpaper
- Paint the panel if necessary and let it dry
- Measure the length of electrical wire needed to complete the electrical circuit between the fluorescent tubes and the ballasts. The wires run from the sockets where the tubes are connected, to the ballasts. Refer to the schematic diagram provided above. Add 5 cm. to each measurement for safety.
- On the upper side
  - Glue the cage clamps with neoprene glue as shown on the diagram
  - Allow the glue to completely dry before continuing
  - Connect the electrical cord to the mini lever connectors
  - Fasten the ballasts
  - Set up the electrical circuit between the mini connectors and the ballasts
  - Cut the different wires needed to connect the fluorescent tubes and strip 3 mm. of them at each end
  - Connect the wires to the ballasts and run them to the bottom side using the holes drilled for this purpose
- On the bottom side (there is no problem to put the panel on the ballasts)
  - Connect the electrical cables to each socket according to the wiring diagram
  - Screw the sockets on the board
  - Evacuate the excess of cable to the top side
  - Install the fluorescent tubes
  - Plug the cord into an electrical outlet
  - Test the functioning of the tubes

EXPOSURE UNIT FRAME

FRONT SIDE







ASSEMBLY INSTRUCTIONS

- For each side of the frame (to be repeated twice)
  - Cut 4 strips (13x27 mm.) of 402 mm.
    - ✔ With the cutting box, cut 45° angles at the ends
    - ✔ Sand and adjust the maximum length to 400 mm.
  - Coat the corners with neoprene glue
  - Assemble the square
  - Press with a frame clamp for one hour
  - Reinforce by nailing the corners on the edge of the frames
- Cut 10 strips (13x13 mm.) of 387 mm.
- Cut 10 strips (13x13 mm.) of 387 mm.
- Quickly sand the cuttings
- Quickly sand the edges of 2 panels 40x40 cm.
- Paint all parts
- For each side of the frame
  - ✗ Glue with neoprene glue and nail the 3 intermediate strips as shown on the front and lateral sides diagrams
- For each panel 40x40 .cm
  - ✗ Glue 2 strips 13x13 mm. on 2 opposite edges with neoprene glue
    - ➢ → they form the right and left edges of the panel
    - ➢ Make sure that each strip is well alligned with the edge of the panel
    - ➢ Nail the 2 strips to strengthen the assembly
  - ✗ Glue 1 strip 13x27 .mm at the end of the 2 strips 13x13 mm.
    - ➢ → this is the back of the panel
- Glue with neoprene glue 1 panel 40x40 cm. to the 2 side frames
  - ✗ Press with a frame clamp for one hour
  - ✗ Screw in 2 places on each side
- Turn the frame over and repeat this last operation with the last 40x40 cm. panel
- Glue with neoprene glue the 3 remaining 13x27 mm. strips on the back side and screw them to the frame

The exposure unit presented here is slightly different from the layout described in the document. The mistakes made during the manufacturing process have allowed us to refine the plan!

e) LED EXPOSURE UNIT

It is quite easy to build a LED exposure unit by using LED strips of several meters long. These strips are cut into sections and glued together on a lightweight board. The following rules apply to make life easier:

- Choose a strip with a density of 60 LEDs per metre (i.e. 300 LEDs for a 5 m ribbon).
- Make sure that the strip can be cut.
- Choose a strip based on SMD 2835 or SMD 5050 LEDs (certainly not SMD 3528).
- Ideally, choose a UV strip with a wavelength of 365 / 370 nm.
- As these are very expensive and difficult to find, a strip with a wavelength of 385 – 400 nm. will do here ; their efficiency might be lower with some other processes.

Use LED<->electrical cable connectors (splice tape connector) and lever terminals (cage clamp) to make the electrical circuit

CALCULATE THE LENGTH OF STRIPS NEEDED

On a strip with 60 LEDs per meter, the LEDs are spaced 1.66 cm. apart. The LEDs are usually grouped in sections of 3, so the length is 5 cm. The cutting lines are normally identified on the strip.

SMD 2538 LED strips are 8 mm. wide. SMD 5050 strips are 10 mm. wide. Regardless of the type of LEDs selected, the density used will be one strip of LEDs per centimetre wide.

The length of each strip will be the closest multiple of 5 cm. to the length to be covered.

Count how many strips can be cut from a 5 metre strip (99 sections of 5 cm. can be used plus 1 if you have a soldering iron). Then count how many 5 m. strips are needed and make sure you always have a little more than you need.

Example: Covering a 42x60 cm. area with 4 m. LED strips

- One strip has 80 sections of 5 cm., of which 79 are usable if you do not have a soldering iron.
- A 60 cm strip needs 12 sections of 5 cm. A 4 m. strip can therefore provide 6 strips of 60cm.
- Seven 4 m. strips will be needed to cover the required area.
- For each 4 m. strip, there will be seven 5 cm. sections left, giving a total of 49 sections that can be used if required.

ÉLECTRICITY

The aim is to keep the electrical circuit as simple as possible. It is not necessary to make a continuous circuit linking the LED strips to each other. The power supply unit therefore supplies each LED strip in parallel.

A 5050 or 2835 LED consumes about 0.2 W. Multiply this value by the number of leds used for the exposure unit to determine the power that the power supply unit should provide.

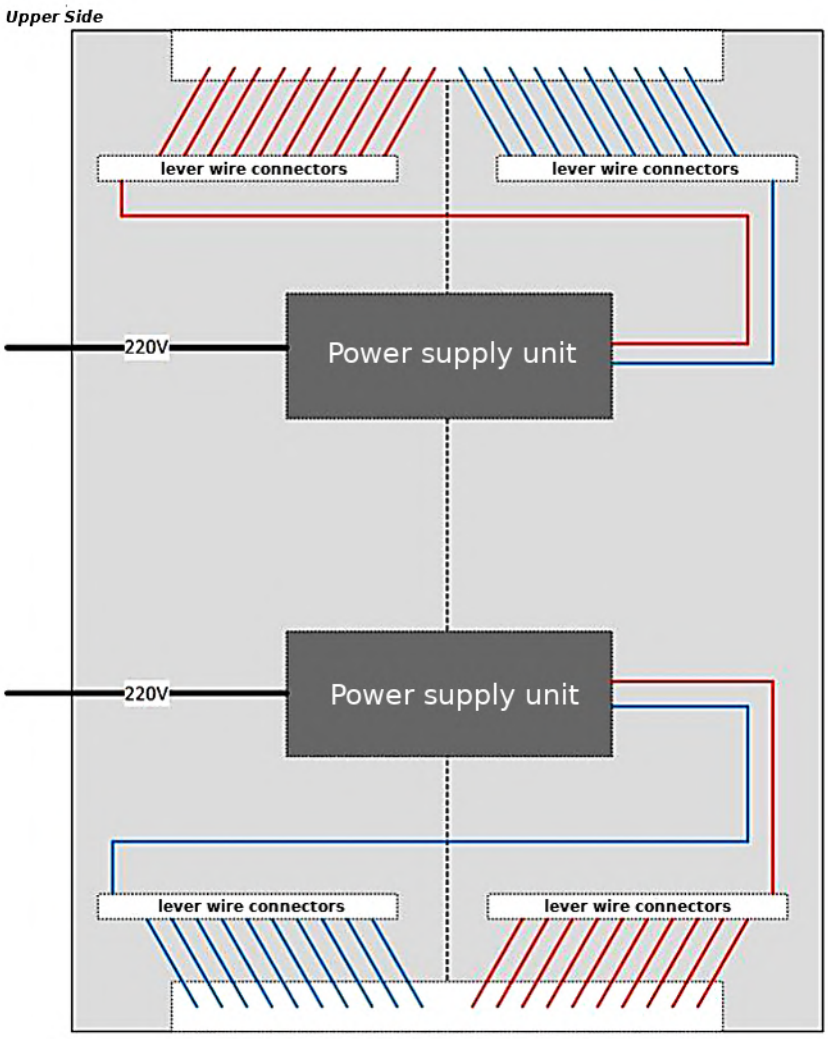
Example : 42x60 cm. exposure unit

- Each 60 cm. strip contains 12 sections of 3 LEDs, that is 36 LEDs.
- The 42 strips therefore contain 1512 LEDs.
- The estimated power consumption is therefore 302.4 W., i.e. 25 amp.
- To play safe, we will use a power supply capable of supplying 30 amp.

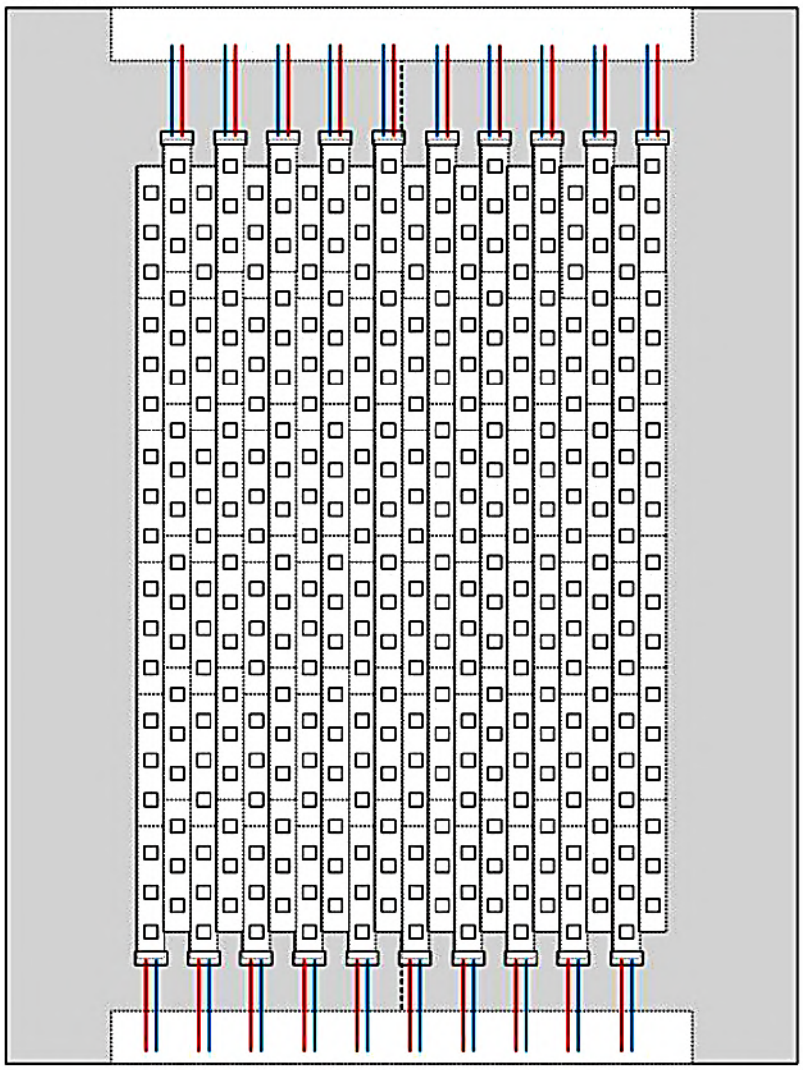
Normally, one power supply unit should be sufficient for such an exposure unit. It may be tempting to divide the power supply between two units in order to simplify the electrical connections of the exposure unit.

EXPOSURE PLATE

The diagrams below must be adapted to the dimensions of the desired exposure unit. For a small exposure unit (type A4 or A3), a low-end photo frame can be used as the basis for the exposure plate. For example, a small frame can be made to position the plate above the printing frame. A distance of 10cm is sufficient between the plate and the printing frame.



Bottom Side



13) POINTERS

There are many communities on the Internet where it is possible to find support and encouragement.

Disactis Forum (French) : http://disactis.com/forum/

Carbon Forum (English language) : https://groups.io/g/carbon/topics

There are also many reference books on the practice of Carbon Transfer. These books are often based on the use of dichromates rather than Diazidostilbene. However, it would be a shame to do without them, as they offer interesting information beyond the dichromates' specificities.

The Bostick et Sullivan Book of Modern Carbon Printing :
https://www.bostick-sullivan.com/product/the-bostick-sullivan-book-of-modern-carbon-printing-written-by-richard-sullivan/

Carbon Transfer Printing: A Step-by-Step Manual by Sandy King, Don Nelson and John Lockhart on sale here:
https://www.routledge.com/Carbon-Transfer-Printing-A-Step-by-Step-Manual-Featuring-Contemporary/King-Nelson-Lockhart/p/book/9781138353831

Sometimes it is good to find inspiration from the professionals who use Carbon Transfer and give it its prestige:

Franck Rondot : https://www.franck-rondot.com/

Calvin Grier : https://thewetprint.com/

14) LICENCE

B) RÉSUMÉ DES CONDITIONS DE LICENCE

VOUS ÊTES AUTORISÉ À :

- Partager — copier, distribuer et communiquer le matériel par tous moyens et sous tous formats
- Adapter — remixer, transformer et créer à partir du matériel
    - L'Offrant ne peut retirer les autorisations concédées par la licence tant que vous appliquez les termes de cette licence.

SELON LES CONDITIONS SUIVANTES :

- Attribution — Vous devez créditer l'Œuvre, intégrer un lien vers la licence et indiquer si des modifications ont été effectuées à l'Œuvre. Vous devez indiquer ces informations par tous les moyens raisonnables, sans toutefois suggérer que l'Offrant vous soutient ou soutient la façon dont vous avez utilisé son Œuvre.
- Pas d'Utilisation Commerciale — Vous n'êtes pas autorisé à faire un usage commercial de cette Œuvre, tout ou partie du matériel la composant.
- Partage dans les Mêmes Conditions — Dans le cas où vous effectuez un remix, que vous transformez, ou créez à partir du matériel composant l'Œuvre originale, vous devez diffuser l'Œuvre modifiée dans les même conditions, c'est à dire avec la même licence avec laquelle l'Œuvre originale a été diffusée.

- Pas de restrictions complémentaires — Vous n'êtes pas autorisé à appliquer des conditions légales ou des mesures techniques qui restreindraient légalement autrui à utiliser l'Œuvre dans les conditions décrites par la licence.

NOTES :

- Vous n'êtes pas dans l'obligation de respecter la licence pour les éléments du matériel appartenant au domaine public ou dans le cas où l'utilisation que vous souhaitez faire est couverte par une exception.
- Aucune garantie n'est donnée. Il se peut que la licence ne vous donne pas toutes les permissions nécessaires pour votre utilisation. Par exemple, certains droits comme les droits moraux, le droit des données personnelles et le droit à l'image sont susceptibles de limiter votre utilisation.

Picto Benelux is an informal group, open to everybody in the Benelux countries having an active interest in photographic processes developed from the very beginning of Photography. The aim is to revisit them, while respecting anyone's creative approach.

https://www.picto.info/

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