



# PICTO Benelux

<http://www.picto.info/>

## Carbon printing with DAS

René Smets – April 2023

A few years ago, the sale of dichromates to private individuals, as well as their use by them, was banned in the European Union. I didn't realise at the time what impact this would have on our work with the old photographic techniques.

Like many others, I still had a good reserve and so I continued to use dichromate quietly until ... I had an allergic reaction in my throat every time I worked with it. Coincidence or imagination? I still don't know.

As a precaution, I removed all traces of dichromate from the house. It didn't take me long to understand the consequences of this decision:

1. As for gelatin-based processes, DAS can be used, among other products.
2. DAS does not work with processes involving gum arabic, such as gum printing or Sury's "Color" process, in which case DIAZO can be used.
3. Both products obviously behave completely differently from the usual dichromate, with DIAZO being even more difficult to handle than DAS. While experiments with DAS have already been undertaken by a number of people and their experiences can provide a basis for starting, this is much less the case with DIAZO.

After a few months wasted in unsuccessful experiments resulting only in full paper bins, I started to get acceptable results, but I was not able to get consistent quality levels. After some further fine-tuning, this is solved now. Below you can find a description of my current carbon printing procedure. It is largely identical to the one described in my document on "traditional carbon printing" (with dichromate) that can be found on the [Picto Benelux website](#).

### My procedure with DAS : first results

**Caution!!!**

**DAS manipulations should only be done under inactinic light!!!**

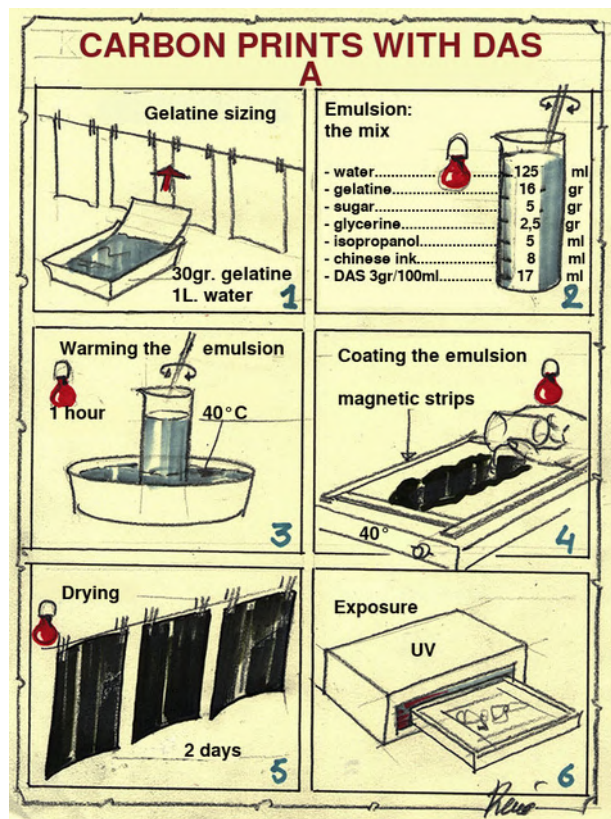
#### **SUPPLIES:**

- Large negative
- Carbon tissue (on which the pigmented emulsion will be coated).
- Support paper (final receiver of the image).
- Beakers (or equivalent containers) as required
- Water bath
- Bath heater
- Magnetic strips
- Squeegee

#### **PRODUCTS:**

- gelatine
- sugar
- glycérine
- isopropanol
- chinese ink
- DAS

**WORK PROCEDURE:** The numbers refer to the accompanying illustrations (Blue = under normal lighting conditions. Red = safelight required).



## Sizing

A-1. For the support paper – the paper that receives the image – I use a good watercolour paper that is to be sized first: see [the PICTO website](#).

## Preparing the emulsion

- A2. - In 100 ml of cold water :  
 dissolve 15gr of gelatine ( 250 bloom).  
 - In 25 ml of cold water, dissolve:  
 6,5 gr. of sugar  
 2,5 ml of glycerine  
 5 ml of isopropanol  
 8 ml of chinese ink

**Under inactinic light from here (DAS)!**

- DAS: mix 3 g with 100 ml of warm water (under inactinic light); take 17 ml to be added to the above mixtures (see below). The rest of the solution and the powdered DAS are put back in the refrigerator.

A3. After ± 30 minutes, the gelatin mixture and the other mixture are heated to 40°C in a water bath. When everything is well melted, the two are mixed together. This mixture is stirred for one hour.

Then the DAS mixture that has also been heated is added (under inactinic light). The mixture is now ready to be coated.

## Coating of the emulsion

A4. The paper on which the pigmented emulsion is to be coated is immersed in cold water (10 minutes) until it stretches out, then it is placed on a hot steel plate and squeegeed so that there are no air bubbles underneath.

It is best to place the metal plate on an old plate warmer, which keeps everything at 40°C.

Magnetic strips are placed around the edges of the paper, creating some kind of a tray.

The hot pigmented emulsion is poured into the centre of the paper (50 ml for an A4 sheet) and spread towards and against the magnetic strips, with air bubbles being pushed out with a piece of paper.

The plate is gently shaken by lifting it a little to obtain a nice, even, mirror-smooth surface.

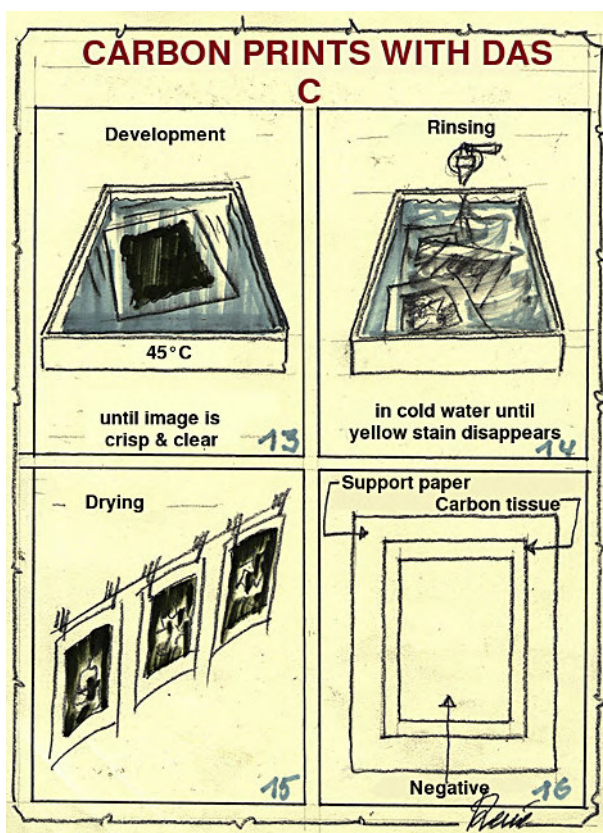
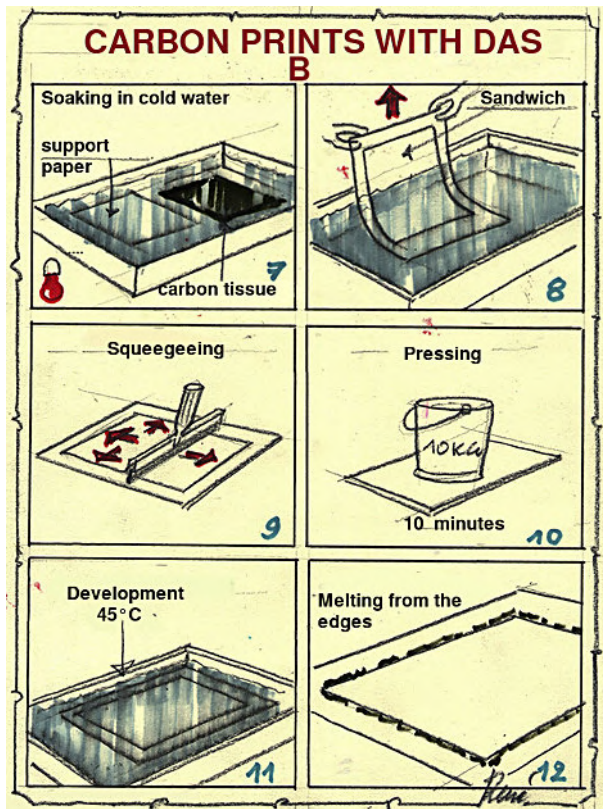
The hot metal plate with the paper is then slid from the hot plate to an adjacent cold plate at the same height; the gelatin starts to solidify.

After a few minutes, the plate can be moved to another cold place.

At that point, the next metal sheets are already ready on the plate warmer.

Once all the sheets are finished, the magnetic strips are removed by running a knife along them and cutting the gelatine.

The magnetic strips are carefully removed by sliding them out.



## Drying

A5. The paper can now be hung up to dry (2 days).

## Exposure

A6. The negative is placed upside down (emulsion against emulsion) on the carbon tissue and exposed to UV light; my initial exposure time of 2 minutes was progressively reduced to  $\pm 40$  sec.

## Transfer

B7. The support paper is placed in cold water for about ten minutes, then the exposed carbon tissue is added and left for about three minutes.

*From this point onwards, it is possible to work under normal lighting.*

Then a soft brush is passed over both papers to remove air bubbles.

B8. The two sheets are placed on top of each other, emulsion to emulsion, and taken out of the water.

B9. This sandwich is placed on a flat surface and squeezed well with a squeegee in all directions from the centre to remove air bubbles and water, which is then dabbed off.

B10. Then a piece of paper towel and a flat plate are placed on top of the sandwich, and finally a weight on top of the whole for about 10 minutes.

## Development

B11. The sandwich is placed in hot water (45°C)

B12. After a while, the melted gelatine will come out of the edges of the pigment paper. After a few more minutes, the two sheets can be separated by taking the pigment paper by one corner and lifting it with a regular movement.

C13. The support paper, now with a layer of pigmented gelatine, is placed in hot water (45°C) and gently shaken; the gelatine dissolves, leaving a beautiful relief image.

C14. The prints are then washed without touching each other

C15. They can then be put to dry.

C16. As far as carbon printing is concerned, the size of the paper in relation to the negative is of utmost importance:

- The negative should be the smallest part, for example 5x7". The carbon tissue should be a few cm larger, and finally the support paper should be the largest.
- This is dictated by the detachment of the gelatin pigment layer when the sandwich is separated.
- If the carbon tissue is larger than the support paper, the edges of the soft gelatin will tear.

## **FIRST CONCLUSIONS.**

DAS works very well when the following points are taken into account:

- 1 - keep the product refrigerated
- 2 - prepare only the amount of solution that you can handle during the session
- 3 - always work under inactinic light (safelight).

## **16-20/04/2023: WORK PROCEDURE - FINAL ADJUSTMENTS**

The method described above did give good results, but still with rather unpredictable variations in quality. I therefore had to improve the process to make it more reliable.

My last tests showed me that the solution was quite simple, and that it was only a matter of increasing the quantity of emulsion spread on the pigment paper (see above page 2, point A4, 4th paragraph).

By spreading 50 ml of pigment emulsion on an A4 sheet of paper instead of the original 40 ml, my results became very consistent and of a quality that I am completely satisfied with. This quantity has therefore been corrected in the above description, which can now be considered definitive.

Here are the results obtained with this new formula on different papers:



*Printed on Canson Montval, no additional sizing*



*Printed on Fabriano n°5 , sized*



*Printed on Canson paper, sized with Gesso*



*Printed on previously fixed-out Agfa photo paper*

*Note: all the prints were made from digital negatives, adjusted on sight, without using a correction curve.*

## **FINAL CONCLUSION**

DAS works equally well as dichromates, and is much more sensitive to light (4 minutes exposure with dichromate, compared to 35-50 seconds with DAS), which involves that exposure has to be very precise. Much less product is needed in the emulsion. This reduces the financial impact somewhat, as the price of the product is high: around 40€/25gr at the moment of writing.

Keep also in mind that the 3% solution is a saturated solution.

It is said that DAS powder, if stored in good conditions (in an airtight opaque bottle for photosensitive products, and in a cool place – ideally in the fridge, or even in the freezer if it is not going to be used for a long period). The working solution is aid to keep for several months if stored in a cool, brown bottle. The future will tell.