

## “Carbon on Canvas”

“Ebony” Carbon Variable-Tone  
Black and White Inkset  
Epson 9800 printer  
[www.PaulRoark.com](http://www.PaulRoark.com)  
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Shoreline, Crescent Lake, 32x40 inch canvas (canvas #2)

This PDF discusses an approach to carbon pigment<sup>1</sup> printing on canvas that might be attractive to fine art B&W photographers and collectors.<sup>2</sup> An Epson 9800 with a 36” roll of Epson Matte Canvas Natural is what has been used to print the initial efforts.

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<sup>1</sup> See <http://www.paulroark.com/BW-Info/9800-Eboni-Variable-Tone.pdf> for details of the inkset on a number of papers. 100% carbon inks are in 7 of the positions, assuring very smooth printing. A single Canon Lucia based pigment, cool toner is in one (LLK) position to achieve a range of traditional print tones, from neutral/cool to warm. This system is for matte paper only. Because of its high carbon content and high quality toner, it is the most lightfast as well as cost effective way I know of to achieve practical fine art B&W printing, particularly for a photographer with a small studio/office (but room for a large printer for this project).

The goals of this approach include the following:

Large<sup>3</sup> – 32 x 40 standard size foam core (and Museum Glass if desired),

Light weight<sup>4</sup> – if displayed without glazing (recommended in adult display venues),

Archival – acid free materials (excludes Gator board), lightfastness at least matching a silver print,<sup>5</sup>

Easy to produce for typical fine art photographers – the large printer is the only needed equipment;

A 17” with roll paper adapter would be the minimum I’d recommend.

Easy to ship, including internationally – able to be rolled into a shipping tube or 5x5x36” box,<sup>6</sup> with interleaving;<sup>7</sup>

This also covers being easy to store safely,

Easy to assemble at the delivery end of shipment – standard foam core, simple frame, needle and thread,

Matte or glossy finish – I prefer matte with an aerosol, solvent based spray; some will opt for a satin coating.

### Printer Pigment Arrangement – for Matte paper (a glossy paper alternative is in the works)

Y = 100% Eboni MK version. 1.1<sup>8</sup>

LM = 6% MK (Eb6-LM)<sup>9</sup>

LC = 9% MK (Eb6-LC)

M = 18% MK (Eb6-M)

C = 30% MK (Eb6-C)

LK = 30% MK (Eb6-C)

K = 100% MK (Eb6-K)

LLK = Light Blue Toner (13.75% Blue, 11.25% Cyan Canon Lucia pigments,<sup>10</sup> 75% clear base.<sup>11</sup><sup>12</sup>

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<sup>2</sup> My first large canvas print sold the first day it was put into Gallery Los Olivos. Some relate to this medium more as a “painting” than a photograph.

<sup>3</sup> For perspective, in an actual home display setting, the following URL links to a Jpeg of canvas #2 (Shoreline, Crescent Lake 32x40”) displayed in a bedroom over a king size bed: <http://www.paulroark.com/BW-Info/Artist-proof-2.jpg>.

<sup>4</sup> I live in California – earthquake territory. We are replacing all of our large glazed prints with these light weight canvas prints if they are in an area where they might fall on a person – like over a bed.

<sup>5</sup> 100% carbon makes by far the most lightfast printing substance available to us, with up to 10 times lower delta-e than even the selenium toned silver print. See Appendix 1 of <http://www.paulroark.com/BW-Info/9800-Eboni-Variable-Tone.pdf>. By using the least amount of and best color pigments, a cool toned print can have a lower delta-e than a lightly selenium toned silver print. See, <http://www.paulroark.com/BW-Info/Eboni-VT-N-v-Silver-Print.jpg>. The Photoshop eyedropper can measure the comparably exposed test patches. Canvas has not been tested yet.

<sup>6</sup> See for example <http://www.advancedindustrialsolutionsok.com/store/mailling-tubes/corrugated-mailling-tubes.html>

<sup>7</sup> Clear polyester film like Mylar seems best. See, for example, <http://catalog.cshyde.com/viewitems/films/mylar-polyester-pet-film/>

<sup>8</sup> Two MKs are probably only useful for Arches watercolor paper. However, one can be used in a separate channel at low limits across the entire print to reduce the amount of toner needed to make a neutral print. The impact on canvas shrinkage from the water in the inks has not been explored.

<sup>9</sup> MIS sells Eboni-6 pre-mixed at <http://www.inksupply.com/eb6.cfm>. For those who want to do their own dilutions, I recommend generic base version c6b. See <http://www.paulroark.com/BW-Info/Ink-Mixing.pdf>. MIS sells this at <https://www.inksupply.com/roarkslab.cfm>. MIS bulk (pint) ink prices are about 15%, on a per/ml basis, the price of Epson ink bought from Atlex.com. If you mix your own inks from MIS Eboni MK and generic dilution base (C6b recommended), the cost can be as low as about 3% of the OEM ink costs.

<sup>10</sup> Canon Lucia Blue (PFI-106B) and Cyan (PFI-106C) are the inks used in Canon’s iPF6300 printer. See for example, <https://www.itsupplies.com/Canon/Canon-imagePROGRAF-iPF6300/iPF6350>. To drain Lucia tanks, I just poke holes in the soft plastic with a clean awl – one high on the side for air to enter and one near the bottom on the side for the inks to pour out of into a 4 oz. bottle. I do this over a sink. See <http://www.paulroark.com/BW-Info/9800-Eboni-Variable-Tone.pdf> at p. 3 for toner details.

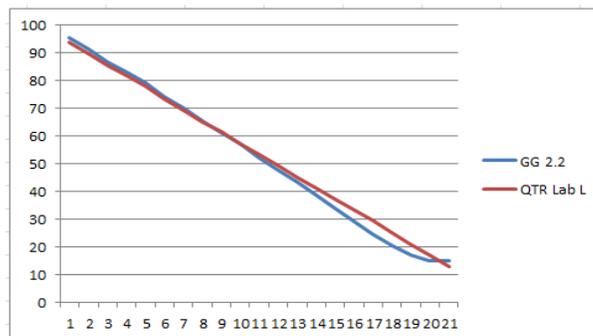
<sup>11</sup> Clear base version C6B is recommended. It can be purchased from MIS at <http://www.inksupply.com/roarkslab.cfm> (no royalties to me). The mixing formula is also shown there.

<sup>12</sup> While there is a light blue toner in this inkset to allow truly neutral/cool prints that have silver-print lightfastness, the best 100% carbon pigment prints are still a primary goal. 100% carbon pigment prints can be made that are only slightly warm on some papers and canvas substrates. My initial canvas prints have used a split tone, with neutral highlights, somewhat warm shadows, and neutral deep black.

## Printing with QuadToneRip<sup>13</sup>

QTR is my preferred printing utility. Note that I use Windows 7 and the QTR Windows GUI. Mac users will have a different interface and workflow, but the profiles are compatible.

QTR, when printed from the Windows GUI, prints with a straight line Lab L characteristic curve. See the comparison of the Gray Gamma 2.2 and the QTR Lab L curves, below.



Because I edit in Gray Gamma 2.2, I need to adjust the print to compensate for the differences in how they print. To do this, I apply a Photoshop curve (after I have saved my master file) that offsets this printing difference just before I print the file. I save this printing file to the Desktop with “QTR” in its name. It can just be dragged and dropped into the QTR GUI. After printing, I delete the QTR-adjusted file. The Photoshop image adjustment curve I use is called “GG22-to-QTR.acv” and is in the Profiles Zip file.<sup>14</sup>

One of the advantages of QTR is that one can use more than a single profile at the same time. This allows for easy and effective split tone prints. I currently favor neutral highlights and warm shadows. Some prefer the opposite. It’s an easy variable to control and utilize for creative control.

## Printing on Canvas<sup>15</sup>

A primary purpose for my having an Epson 9800 is to make large canvas prints. To be honest, I had never seen a canvas B&W that I liked – until now. While I am currently using Epson Matte Canvas Natural,<sup>16</sup> there appear to be a number of interesting alternatives.<sup>17</sup>

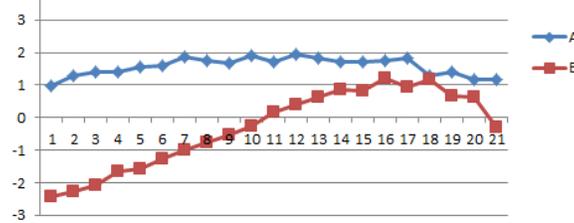
<sup>13</sup> See <http://www.quadtonerip.com/html/QTRoverview.html>. Profiles can be downloaded from <http://www.paulroark.com/BW-Info/9800-EbVT-Profiles.zip>.

<sup>14</sup> One can also make this adjustment by converting the workspace to QTR\_Gray\_Matte\_Paper, an ICC that is supplied in the QTR download. In either case, be clear that you are no longer in Gray Gamma 2.2, and the images will look dark in that space. The internet uses the gamma 2.2 space, as does Adobe RGB, which is what our cameras generally capture images in (sRGB is very similar also). So, I recommend working in Adobe RGB (1998) and Gray Gamma 2.2. I use the converted files only for printing; then I delete them.

<sup>15</sup> I do not recommend attempting to print canvas on most desktop printers. Canvas is best used on wide format printers and in the form of rolls. Use “wider” platen gap to avoid head strikes. Note that canvas shrinks about 1% along the long axis of the roll – the “warp” as opposed the “weft” (I think).

<sup>16</sup> See Atlex at <http://www.atlex.com/epson-exhibition-canvas-matte-natural-oba-free-36-x-40.html> for the 36” roll. Note that the Exhibition Matte Canvas that does not have the word “natural” in it is a very different paper, and not very good at all – low dmax, OBAs, thicker/more curl, heavier texture, odd matte with a touch of gloss finish. Interestingly, the non-OBA Epson Matte Canvas “Natural” is a “bright” (negative Lab B, or “cool”) substrate. There is a modern version of a “gesso” layer between the tan canvas and the inkjet coating that must have some kind of brightener in it. I will fade test this. The paper smells when printing – perhaps similar to a latex. An isolated or well ventilated printing room is recommended for this Epson canvas. It lasts for about a day.

These canvas products appear to have a rather normal tonal range with Eboni carbon. I am currently using a combination of the neutral and carbon profiles with a total delta lab B of about 3 units. The blending of the “Neutral” (straight line Lab B from paper to black point) and 100% carbon “db6” (delta Lab B of 6 from paper white to warmest point) curves, from highlights to shadows in QTR is as follows: Neutral curve 100, 70, 50; db6 curve 0, 30, 50. The Lab A and B curves for this are below. The highlights are “bright,” midtone neutral and shadows slightly warm.



## Canvas Display and Framing

One attraction of canvas for some is that it can be displayed using a “gallery wrap” approach, avoiding the cost and weight of a large frame and glass/acrylic. Modern, pre-cut, easy to use stretcher bars are available from outfits like Breathing Color. However, the “easy” stretcher bar systems that use adhesives and glues make shipping and storage in tubes impossible. Conservators do not like these systems. Inkjet canvas tends to sag after a while in a stretcher system. As such, stretcher bars that can be tightened easily are useful. There are framers who will do stretching for photographers and others, using systems that avoid adhesives and can be disassembled for storage and shipping (but professional re-stretching will be needed at the receiving end). Currently, I’m not going to “gallery wrap” route, but I am looking at a mounting system that looks like gallery wrap or “museum” wrap, but is acid free and easy for the individual photographer to assemble.

I like a frame and some separation between the image and the surrounding environment. Additionally, some purchasers may want to put acrylic or Museum Glass over the canvas for maximum protection.<sup>18</sup> So, my current experimental approach is what I call a “loosely hung” canvas on acid free foam core. That is what is displayed on page one of this PDF and is covered further below.

While a framed canvas looks best to me when an individual print is displayed, the ability to “tile” a very large image on several smaller canvases makes the “gallery wrap” alternative potentially very attractive to those with 17” printers.

Many high volume and some fine art canvas printers now prefer to use a water-based adhesive to adhere the canvas to **Gator board**. This board is stiffer than foam core, but not archival, as it is made with wood chips in the hard surfaces. It requires a table saw to cut it to size.

One of the attractions to Gator board over foam core is that foam core will not hold the canvas flat when this approach is used. The canvas on foam core will warp. This is because canvas shrinks when it gets wet. Printers have noted that canvas images are slightly shorter than the file size would indicate they should be. This appears to be due predominantly to the canvas shrinking along the long side from exposure to the aqueous inks. Gator board is strong enough to stop the warping. On the other hand, those stresses are still there and can’t be good for the canvas longevity. Laminates ultimately crack and separate from the stresses. It would seem prudent to keep these stresses to a minimum.

<sup>17</sup> My testing is consistent with Premier Imaging’s statements that their Generations Matte Canvas achieves the best dmax (up to 1.74, and coating does not significantly increase this). Epson Matte Canvas Natural also has a good dmax (up to 1.69).

<sup>18</sup> The cost for a 32 x 40 acrylic from my Los Angeles supplier is about \$40; Tru Vue Museum glass wholesale is about \$100.

I have now successfully tested using 3M “Super 77 Multipurpose Adhesive” spray<sup>19</sup> to mount a canvas to acid free foam core. It appears to work well, with no warping. To do this, consider wrapping the canvas around a tube and spraying the foam core. The canvas can then be rolled onto the tacky foam core easily.

Many say that a heavy, **water-based coating** is needed on canvas to protect it, and for the typical gallery wrap that is going to be stretched and then handled with fingers on the image, this may be the best way. On the other hand, my local Samy’s service bureau has no spray booth and uses Premier Imaging Print Shield or Hahnemuhle protective spray (the solvent-based, aerosol product),<sup>20</sup> as opposed to the water-based Eco Print Shield that many recommend for maximum protection.<sup>21</sup> Particularly where the canvas is glued to a foam core, the solvent based sprays to seal it would see not only appropriate, but may be both better and easier for individual photographers.

Currently, I believe the Lascaux Fixativ spray I’ve used for years on prints is the safest bet for long term archival keeping. The solvent-base sprays, when used in a manner to keep the print’s finish matte, are not waterproof, (but then neither is the glossy version of this canvas that Epson recommends for display with no spray). For maximum protection where, for example, kids might handle the print, I recommend putting it under acrylic. For adult environments, this display is more robust than many commonly sold pieces of art, including those that use Museum Glass (like the “French Method” pastel paintings).

I find that the matte canvas with no coating looks the best. Once there is even a satin coating on the print, the canvas texture picks up highlights and masks, particularly, the darkest areas, reducing the visible dynamic range of the print. To keep the matte look and decrease the possibility of some rub off in the 100% black areas, Lascaux Fixativ (non-UV) spray works just fine.

### **Framed, loose-hanging canvas**

So, not out of character for me, I’m not inclined to use any of the “standard” canvas alternatives. I will spray the canvas with a solvent based acrylic to keep the matte finish, and I will not use stretcher bars or adhesives.

I am testing a new approach that I suspect few commercial people will follow or relate to. After the canvas has been laying out flat on a 32x40 piece of foam core for a couple of days to “relax,” I use scissors to cut the canvas to size, and then I sew the top of the canvas to standard acid free foam core.<sup>22</sup> I used 6 lb. monofilament fishing line and am now trying a light gray quilters’ thread.<sup>23</sup>

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<sup>19</sup> This is probably the same as “Photo Mount” spray, but carried by Ace hardware.

<sup>20</sup> Note that a heavy solvent-based Print Shield coating may crack when stretched and bent over stretcher bars. Acrylic is brittle and does not stretch. On the other hand, a light, low viscosity acrylic spray that keeps the matte finish appears to be fine if no stretching or sharp folds are made in the print.

<sup>21</sup> To do a good job with water based coatings, a HVLP sprayer and dust free spray booth is needed, particularly for large prints. On the other hand, the “giclee” service bureau used most by local artists in my area now uses rollers to apply the coatings. To get an even and dust free rolled coating is tricky, if not impossible with large canvases. The most even and perhaps best overall roller-applied coating I’ve seen and made used a method shown to me by Premier Imaging. It involves 3 thin coats of the varnish. The first 2 are glossy; the third uses their satin Eco Print Shield. Foam rollers are used, and the print is taped to a smooth surface to keep it flat. After a heavy coat of varnish is applied, a dry roller is used to remove the excess. As little as 15 minutes can be enough time to wait between coats. This takes practice and the opportunity for dust is obvious. There are service bureaus that will do coating for third parties, and that is what I’ll use if a customer specifies a non-matte finish.

<sup>22</sup> As second piece of foam core with some flat, heavier material on top of it holds the canvas down flat, though after a day, they lie quite flat. I think pre-punching the needle holes for the entire canvas before sewing helps.

<sup>23</sup> Using a “blanket stitch” aligns the threads with the canvas weave better than the spiral type of stitching I initially tried.

See how to do this type of stitch at <http://www.paulroark.com/BW-Info/Blanket%20stitch.pdf> .

When complete, the canvas hangs from the top edge that has been sewn to the foam core. I allow it to hang free for a few days before making any attachments along the sides.<sup>24</sup> What works best along the other sides is still an open question. On the initial print, with just three side attachment points, a critical viewer could see that the canvas is not tight if the canvas is viewed from a very obtuse angle. If the canvas is poked, it is obviously loose. Gallery visitors did not notice anything until I pointed it out, and none appeared to have a negative reaction to it.<sup>25</sup>

The foam core with canvas is put into a standard black wood frame with a frame nailer. The overhang of the frame on the canvas ("rabbet") hides the sewing and thread, which blends into the canvas structure and is virtually invisible to start with.

Acrylic with a spacer<sup>26</sup> can be put in first for protection if that is called for by the display location. For adult environments the Lascaux-sprayed matte canvas can be displayed without glazing.<sup>27</sup>

### **Printed Border**

I print on a border to give the image an appropriate separation from its environment. In traditional B&W photo display, this is accomplished with a matte board. With paintings, this separation has been traditionally accomplished with a relatively wide frame. I use a 1 ¼ inch wide frame and print an appropriate border onto the canvas. I leave a half inch of the canvas un-altered for signing. Also, viewers can come up close to see the substrate in this white border area. The remainder of the border accentuates the canvas nature of the print. I want people to know this is canvas.

What pattern, if any, to put on the printed part of the border is subjective and part of the creative process. I see it as an important part of the overall package, and it's not something I am going to just cede to a piece of cardboard (mat board) or a frame.<sup>28</sup> As demonstrated in the image on page 1 of this PDF, a sense of depth is very much part of what a good printed boarder can accomplish.

The canvas can be taken out of this frame easily and undamaged. It can be rolled with a mylar interleaving and stored or shipped inexpensively in a tube or 9x9x36 box. Another canvas can be sewed onto the same foam core and put into the same frame. The border part of the canvas is plenty durable to take the handling.

I make my own frames from stock that costs about \$1/foot.<sup>29</sup> The foam core is bought in standard 32x40 inch sizes from a local art store.<sup>30</sup> Cutting foam core, if needed, is easy on a cutting mat on the floor with a straight edge and sharp razor knife.

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<sup>24</sup> Canvas #1, at three points along the right and left sides, had threads go from the edge of the canvas, around the edges and to the back of the foam core. These are laced with string and allow an adjustable, slight tension to be put on the edges to flatten residual curl. The bottom of the canvas appeared to need no work.

<sup>25</sup> Having a frame that is deep enough that the relatively loose canvas is protected from being touched when leaned against something is worth factoring into the materials and approach.

<sup>26</sup> I use adhesive spacers on the acrylic/glass. Glass at 32x40" size is heavy, and Museum glass is sensitive to touch, and hard to deal with. At this size, I do not recommend it for most.

<sup>27</sup> Buyers should understand that art is often sensitive. Even with the Lascaux coating the deep black areas will show some effect of being touched and a hard edge like the back of a fingernail will leave a mark that has a different reflective character. At an obtuse angle with light where it would be reflecting off the canvas, the area rubbed with a fingernail will show as having a slightly more reflective character. The tops of the canvas bumps get, in effect, a bit burnished. In normal display, no one will see either of these effects. The bottom line is that matte canvas is subject to some damage if not properly handled, but no more so that many other art media that have been sold regularly without significant problems. This medium is not aimed at a rough or outside display setting.

<sup>28</sup> The outer edge of the border is the cutting line. I use scissors to cut the canvas down to the edge of these borders. No mat cutter or large paper cutter is needed.

<sup>29</sup> I buy framing and other materials by the case from Larson Juhl, through a local framer. They deliver only to storefront professional framers, but those people will often resell case quantity deliveries at near wholesale prices. I use a Hitachi laser-guide chop saw (about \$100) with a high tooth count blade.

<sup>30</sup> I have found Michaels tents to have warped foam core.

Wood frames are the easiest to deal with if you have a frame nailer, which is worth the price.

So far, I think this is the most archival, easily storable and shippable solution I've been able to come up with. Aside from a large printer, no unusual or expensive tools are needed.

### **Canvas Sales and Production ("edition") Limits, and Printing for Others**

I will limit my output of large canvas prints the same as I have for full sheet Arches prints – no more than one pre week, all images included. The point of this is simply to have an understanding that these are all one of a kind, hand crafted pieces. I have no interest in producing more. The reality will be far fewer. If demand exceeds this, the price will simply go up. This approach is the easiest for me to keep track of. I'm interested in producing art, not keeping track of sales on spread sheets.

Prints made for others are not counted in this production limit, of course. Those who want to purchase or have a print made should contact me via email – [roark.paul@gmail.com](mailto:roark.paul@gmail.com).

(That's it for now.)