

HOW TO CHOOSE AN INKJET PAPER FOR PRINTING

What's the right paper to print the perfect image?

Ultimately, there is no right or wrong way to produce art, but in an effort to get closer to an answer on inkjet papers, we invited professional photographer and printmaker Renée Besta to share what she knows about paper types.

Follow her tips below to get a sense for what types of papers can be suitable for various types of images.



Fountain of Grace – Printed on Baryta Paper

Without fail, one of the most common questions asked by students in printing classes is how to choose a paper for a specific image.

With the wealth and diversity of superb inkjet papers on the market today, even experienced printmakers have difficulty with how to choose the right paper for printing.

The number of choices can simply be overwhelming.

In part because of this fact, most images today sadly never make it into print form, remaining forever ensconced in monitors only to be viewed on the web. Printing is an art and a science – a craft that takes time to learn – as is choosing the most suitable paper for a particular image.

To make matters more confusing, paper selection includes both important scientific data, as well as unquantifiable artistic qualities. When examining a paper's specification data sheet, numbers and data sometimes overwhelm and don't paint the entire 'picture' in regards to artistic choices. In this post, I will attempt to clarify various paper types and some important characteristics and terminology to help guide you in making paper selections.



Vibrance Baryta

Specification Data Sheet



THE MOST ADVANCED INKJET PAPER IN THE WORLD.



DESCRIPTION

Vibrance Baryta is a stunning combination of 100% cellulose base, and a premium inkjet-receptive coating containing barium sulphate that gives the high-gloss surface you expect from a baryta paper. Vibrance Baryta is bright white and optical brightener free, exhibiting the outstanding quality and longevity that is characteristic of all Breathing Color products. This luxurious photography paper has a fine surface texture and a baryta gloss finish. It is both acid and lignin free. Vibrance Baryta is ideal for the most demanding photographers, and lends itself particularly well to black and white images.

PHYSICAL SPECIFICATIONS

Type of Material:	100% Cellulose
Basis Weight:	345gsm
Caliper:	14 mil
Texture/Surface Finish:	High Gloss Baryta
CIE Color F7/2°:	L* 96 a*=-1.10 b*=-0.40
Brightness:	91.00

RECOMMENDATIONS

Aqueous Inkjet Compatibility:	Canon®, Epson®, Hewlett-Packard®, Roland®, Mutoh®, Mimaki®, ColorSpan®, Encad Novajet®
Solvent Printer Compatibility:	N/A
Ink Compatibility:	All dye and pigment inks
Optimal Printing Environment:	70°F (21°C) / 30-70% relative humidity
Handling:	Avoid touching the coated surface of the paper. Cotton gloves should be used when handling inkjet coated materials from Breathing Color. Note: coated surface of every roll faces outward.
Storage:	70°F (21°C) / 50% relative humidity. Store in original packaging and in a controlled environment.
Shelf Life:	Minimum 1 year from purchase date when stored as specified.
Lamination:	Not required, but always highly recommended by Breathing Color
Print Settings & ICC Profiles:	Custom ICC profiles will produce optimum results.



Note: Actual print stability will vary according to media, printed image, display conditions, light intensity and atmospheric conditions. Breathing Color does not guarantee the longevity of prints. For maximum print life display all prints under glass or lamination or properly store them. All of the descriptive information and recommendations for the use of Breathing Color products should be used only as a guide. Furnishing such information and recommendations shall in no event constitute a warranty of any kind by Breathing Color. All purchasers of Breathing Color products shall independently determine the suitability of the material for the purpose for which it is purchased. Seller's and manufacturer's only obligation shall be to replace such quantity of the product proved to be defective. Neither the seller nor manufacturer shall be liable either in tort or in contract for any loss or damage, direct, incidental or consequential (including loss of profits or revenue) arising out of the use of or the inability to use the product. No statement or recommendation not contained herein shall have any force or effect unless in agreement signed by officers of seller and manufacturer.



INTRODUCTION

Let's begin by first taking a look at the basic categories of papers available on the market today. We will then review some paper characteristics and terminology. Finally, I will provide examples of some of my images and go over the reasoning behind my paper choices for those images.

Remember, the selection of a paper is a very personal, artistic decision. Only the artist can determine what type of paper best conveys their vision. There are no hard and fast rules of thumb for any given image. Like all art, photographic images speak to us in a deeply personal and spiritual way. It depends on the mood you are trying to convey and emotional content of each particular image.

I always recommend that people print the same image on a variety of papers to determine what looks and feels best to them. Purchasing sample packs from various manufacturers is good for that.

I always buy boxes of different brands and types of letter size sheet paper so I can make multiple test prints. After printing on a variety of papers for awhile, you will begin to know by looking at your image what paper will best evoke the mood you want to get across to the viewer. You will also gain a lot of knowledge about the printing workflow.



Pro Tip: I cannot emphasize enough how important the quality and resolution of your source image are to achieving an excellent print. As well as the age, quality and ink set of the printer you are using. The greater the number of color inks and dilutions of black inks, the better. Printing technology has greatly improved in recent years, just as color gamuts have steadily increased.

Hopefully you are printing a 16-bit tiff or psd (not jpeg) in the ProPhoto RGB (or at least Adobe RGB) color space; the image has been non-destructively edited; has proper noise reduction and sharpening applied; and has ample pixels to print at the desired output size with little or no artificial interpolation.

I presume if you are reading this article, you care deeply about your art and wish to showcase it in the best possible manner. This means selecting an excellent paper with not only good permanence, but rich dense blacks, a wide color gamut and dynamic range, smooth tonal transitions, a substantial feel, the right surface for the image, and more.

PAPER TYPES

There are two basic types of papers.

Photo papers such as glossy, luster, pearl, satin and metallic utilize photo black ink, while **matte papers** such as cotton, alpha-cellulose and canvas utilize matte black ink.

In addition, there is a newer crossover category: fiber-based baryta photo papers (defined below). Due to the differences in how readily ink is absorbed by and spread out into these papers, as well as the specific coatings used and surface textures, it is critical to choose the correct main black ink for each paper type. Photo and Matte Black inks each have distinct formulations and are specifically engineered to compensate for the differences between matte and photo papers.

1. RC Photo Papers

By far the most common paper on the market, the RC in this paper name stands for resin-coated.

When we speak of RC prints, we are mainly referring to the traditional, wet-processed, darkroom photo papers coated with resins that allowed for quick processing and drying times. Those prints were also more scuff and curl resistant. The term RC paper has carried over into today's inkjet world, and they are produced from a refined wood pulp base encased in two layers of plastic polyethylene, then coated with a microporous inkjet receptive emulsion. RC papers are more water proof and scuff and scratch resistant than their matte paper counterparts, but are much thinner.



Shown Above: Breathing Color Vibrance Luster Paper

RC paper surfaces range from glossy to semi-glossy, luster, pearl, satin and more. By far, these are the least expensive and most widely used inkjet papers by most consumers. They deliver deep blacks and white whites, great contrast and sharpness, and are certainly appropriate for a variety of subject matter. RC papers are usually the go-to papers for portrait and wedding photographers.

What they lack, however, is that hefty fine art look and feel. I personally do not care for RC papers, as they tend to crease easily and feel too thin and plastic for my taste. I also do not like the surface texture of many of these papers, as I feel they get in the way of the image.



Goblins of the Desert, Trona Pinnacles, California – Printed on Baryta Paper

If you are like me, and are seeking the highest quality print in a fine art photo paper category, there are better choices such as the newer class of fiber-based baryta papers (see below). Again, this is solely a personal artistic decision and depends on the ultimate destination of the print. Is it being given to your Uncle Bob or are you attempting to exhibit the print in a gallery?

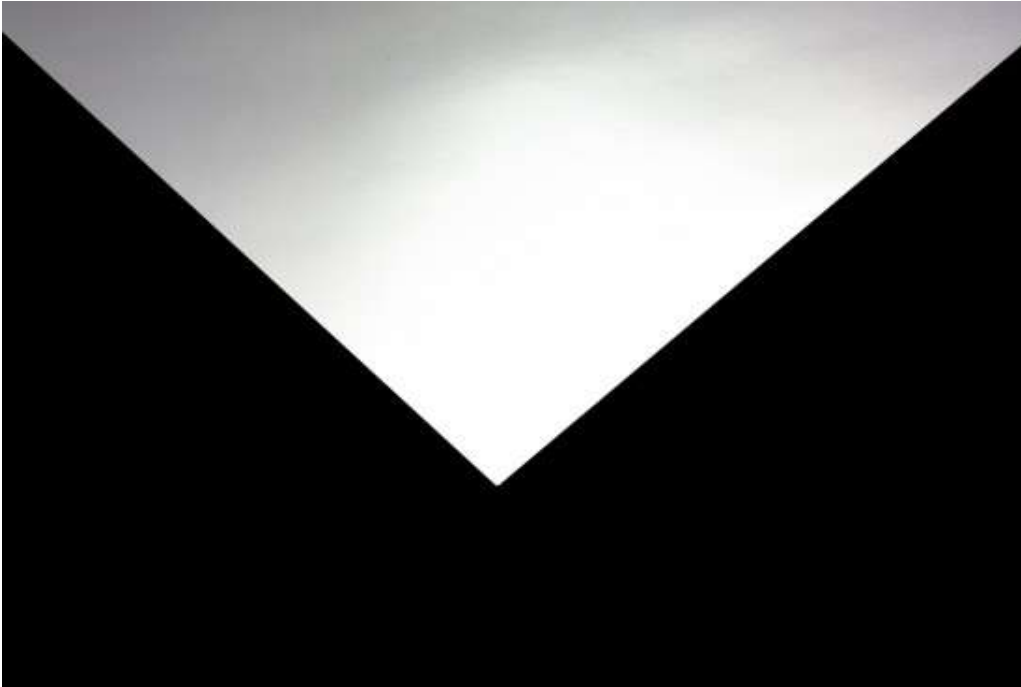
If you are only showing your work at local county fairs or arts and crafts festivals, then RC papers are fine. Just be aware that fine art collectors and buyers, as well as museums, would not consider these papers acceptable. It all depends on your target market if you are selling your prints.

Pro Tip: The glossiest papers are the least forgiving in terms of source image defects such as noise (luminance or color), post-processing artifacts, neglected sensor dust spots, and pixelation resulting from low resolution. In addition, HDR processing artifacts such as halos and chromatic aberrations are glaringly obvious on a high gloss substrate.

2. Metallic Papers

One of the newest and hottest inkjet papers today, metallic papers are fashioned after the extremely popular Kodak Endura Premier Metallic paper, a professional color negative paper designed for wet chemical processing.

All the rage in recent years, metallic inkjet papers have a slight warm tone and high degree of luminance and reflectivity. They exhibit rich, dense blacks, a superb color gamut and contrast range, and lend an almost 3-D look and feel to the image. This is a great paper choice for a wide range of subject matter, especially images with metal such as machinery, cars, trucks, trains, planes, etc. I only wish these papers had more weight and thickness. Breathing Color produces such a paper called Vibrance Metallic.



Shown Above: [Breathing Color Vibrance Metallic Paper](#)

3. [Fiber-Based Baryta Papers](#)

Back in the darkroom days, the gold standard of silver halide papers were the so-called fiber-based, air dried, double weight papers with a smooth reflective surface.

The term **baryta** comes from the chemical compound barite – barium sulphate – which is a naturally occurring, clay-like mineral added to the fiber paper base. In the past it was used to whiten papers, provide reflectivity, and serve as a base for the light sensitive emulsion.

Today's baryta inkjet papers all have a fiber base (either cotton or alpha-cellulose – see below); the barite provides a smooth reflective coating. These thick papers have a distinct (but not unpleasant) chemical odor. In the early days of inkjet printing, due to ink technological limitations, if you wanted to print on hefty paper with a fine art feel, you were limited to fine art watercolor papers. Unfortunately, these fine art papers had lower resolution, contrast, and black ink density.

Now the baryta papers have set the gold standard for fine photographic papers with incredibly rich blacks, wide gamuts, great contrast and sharpness, and smooth tonal transitions. These papers are perfect for black and white prints. Breathing Color's Vibrance Baryta falls under this category. Other baryta papers on the market include Canson Infinity Baryta Photographique, Hahnemühle Fine Art Baryta, Ilford Galerie Gold Fibre Silk, Museo Silver Rag, Red River San Gabriel SemiGloss Fiber, and many others.



Shown Above: **Breathing Color Vibrance Baryta Paper**

4. Cotton Fiber Papers

These are the most expensive but highest grade of fine art matte papers, and are considered to be the cadillac of all paper types for those wanting the ultimate fine art quality. Note that the outdated term 'rag' paper is often used (cotton rag or photo rag) and refers to mostly pure cotton papers. In the olden days, actual rags were used to make papers. Of course this is no longer the case. The term fine art paper generally means a pure cotton rag paper.



Shown Above: Breathing Color Pura Smooth Paper

5. Alpha-Cellulose Papers

These matte papers consist of high grade wood pulp made from trees, then refined to remove unwanted compounds such as acid and lignin. Lignins are organic polymers present in the cell walls of plants, serving as a glue to hold the cellulose fibers together.

However, if the lignins are not removed, breakdown and yellowing of the paper will take place over time. Alpha-cellulose papers are less expensive than 100% cotton papers and have a less sturdier feel. Note that the term alpha-cellulose is used to distinguish these papers from pure cotton fiber papers, which also contain cellulose.

6. Hot and Cold Press Papers

Hot press or cold press papers are actually subcategories of cotton fiber or alpha-cellulose papers, and are distinguished by their surface characteristics.

A hot press paper has a smooth velvety surface, while a cold press paper has a rougher surface and more tooth. Cold press papers have much more texture than a hot press paper, ranging from slightly to highly textured. The surface choices vary widely.



The Uninvited – Printed on a Hot Press Natural Cotton Paper

Pro Tip: Cold press papers can be useful in situations where you need to produce a large print, but have a source image with lower than optimal resolution.

The rough texture can mask some of the pixelation that would be glaringly apparent on a glossy photo paper. They are also useful for landscapes with cloudless skies, an undesirable situation for photographers. The texture can help fill in an otherwise empty looking sky. Of course any image with a more subdued, ethereal, or painterly feel works well too.

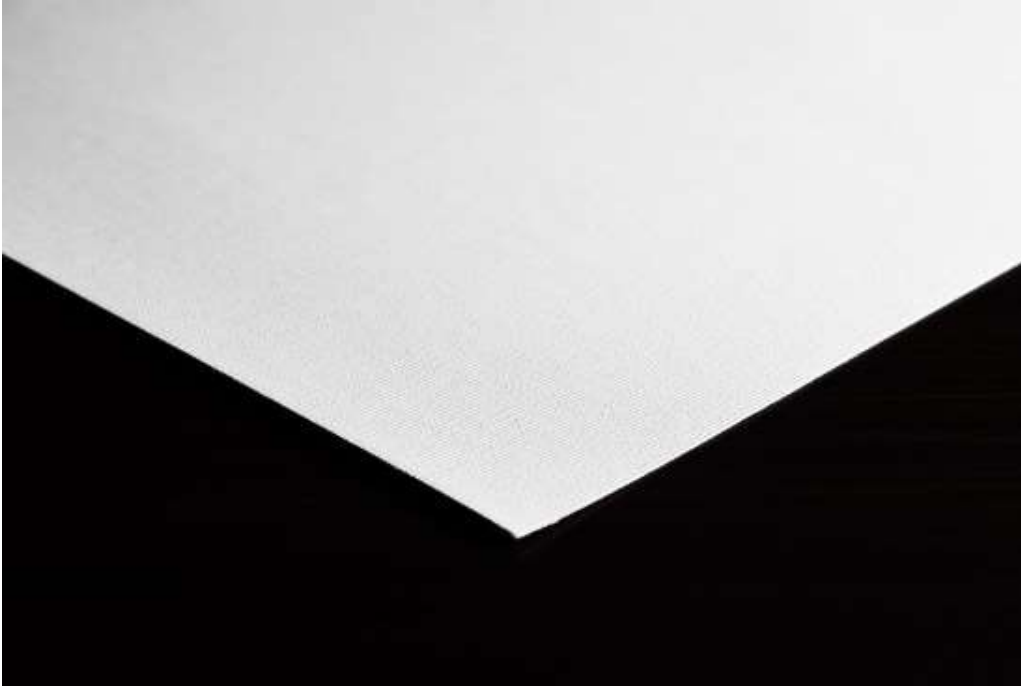
Examples of hot press papers include Breathing Color's **Optica One** or **Pura Smooth**, whereas **Elegance Velvet** and **Pura Velvet** are cold press papers.



Shown Above: [Breathing Color Pura Velvet Paper](#)

7. [Canvas Papers](#)

Canvas papers are usually a combination of polyester and cotton. Since ancient times, canvas has been closely associated with art. Due to the fact that this durable artistic substrate can be varnished and displayed without glass or frames, it is a very popular choice, especially for traditional artists who have so-called giclée reproductions made of their originals. A great choice for more abstract, subtle images with a painterly feel or art reproductions.



Shown Above: [Breathing Color Lyve Canvas Paper](#)

8. Specialty Papers

Additional exotic inkjet papers available on the market include substrates such as Bamboo, Sugar Cane, Kozo (Japanese Mulberry), and even Hemp (no, this does not give you that kind of paper 'high').

PAPER CHARACTERISTICS AND TERMINOLOGY

There are numerous scientific terms used to define paper characteristics. In this section, I will review some of the more important ones. A complete compendium is beyond the scope of this article and may only complicate your paper choices by including too much scientific data.

For instance, you may hear these terms bantered about: paper weight and caliper (thickness); brightness; opacity; permanence ratings; the presence or absence of OBAs; tonal transitions; DMax; ink density; gray balance; paper white point (the color of white); surface textures; sheen; microporous or swellable; dynamic range; Cobb numbers, and more. Some of these stats can be found on paper data sheets, while other paper manufacturers provide little if any information.

Here are some characteristics to take into consideration when choosing a paper:

Paper Weight and Thickness

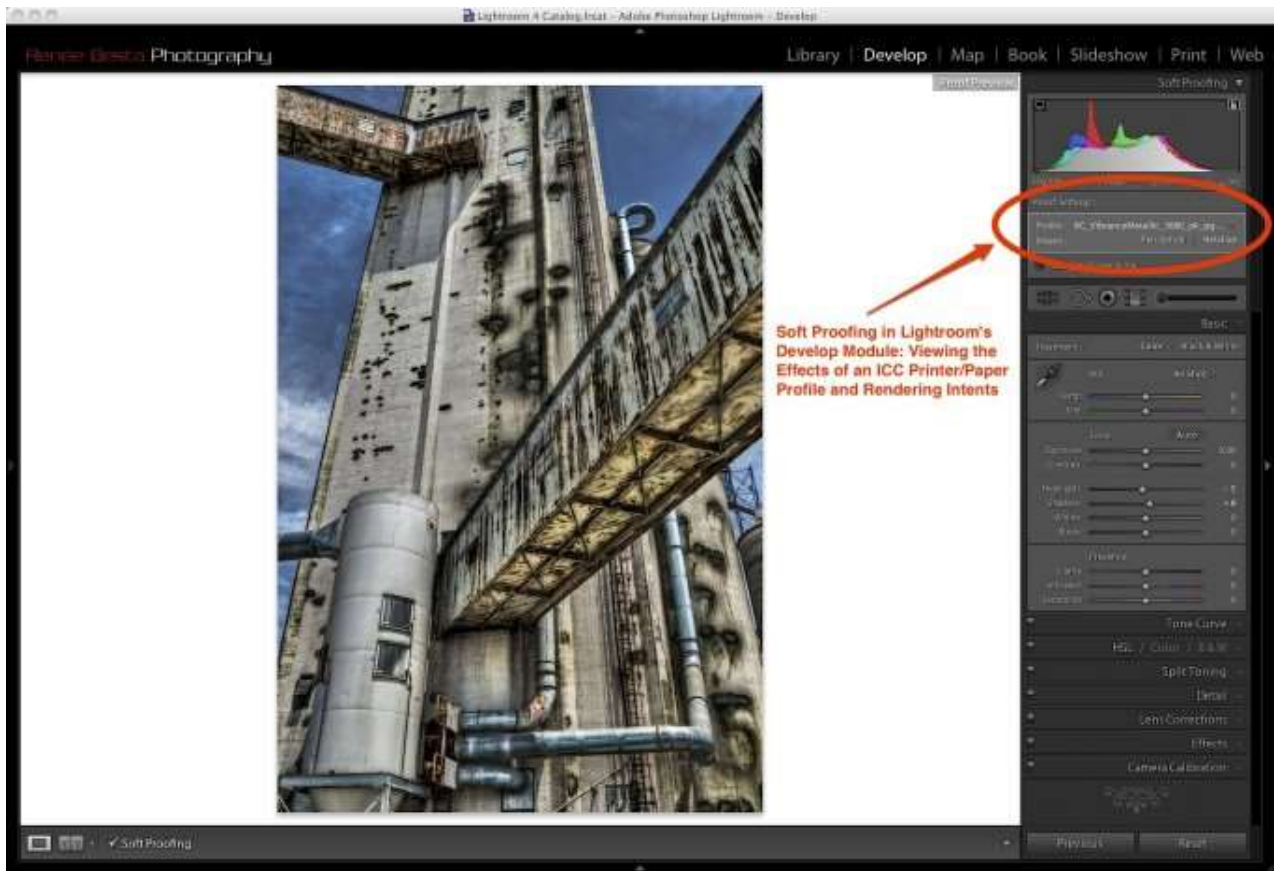
Paper weight is specified in grams per square meter (gsm) and paper thickness (caliper) in mils or mm. Beware there is not an exact correlation between a paper's weight and its thickness.

Art buyers and collectors as well as fine art photographers prefer the heftier, thicker papers for their sheer beauty and substantial, more tactile feel as well as other characteristics such as surface texture. Paper weight and thickness set fine photographic and art papers apart from their much thinner, plastic counterparts such as the RC glossy, luster, satin, or pearl papers.

OBA's and Paper Brightness

Optical Brightening Agents (or additives) are fluorescent chemical compounds used to increase paper whiteness and brightness (two different things – color of white versus intensity). Since papers in their natural state are more off-white, creamy colored or warm, these agents trick the viewer's eyes into perceiving a brighter white by reflecting blue light off the paper. This of course depends on the lighting conditions under which the print is viewed. OBAs accomplish this by absorbing invisible ultraviolet light and then releasing that energy over time as visible blueish light.

Bright white papers have long been favored by photographers for their deep blacks and great dynamic range. However, the use of OBAs is highly controversial as these compounds break down over time, causing the paper to return to its original native white point. To be clear, OBAs do not degrade inks. How can you tell if a paper has OBAs? If a paper is described as Bright White or Natural, that tells the story. The natural paper is warmer and OBA-free. The bright white paper will have some OBAs present. Note that the use of OBAs is not limited to photo papers alone; even some cotton papers have them.



Soft-Proofing Dialog Box in Lightroom: Viewing the Effects of ICC Profiles and Rendering Intents

Paper White Points

If you have ever examined multiple swatches in a paint store for the 'color' white, you know there are many variations from pure snow white, to eggshell, creamy, off-white, etc. Just as we calibrate our monitors to a particular white point (the cooler D65 or warmer D50), papers too exhibit a wide variety when it comes to shades of white. Whether to use a warmer or cooler paper depends on your subject matter. For portraits and most color landscapes, I would avoid very bright white papers. For neutral black and white images, bright white papers work well.

DMax

This refers to the deepest shade of black (black density) a paper is capable of rendering and is one of the most important considerations in choosing a paper type. Photo papers always have a higher DMax value (> 2) than a matte paper (usually < 2), simply because matte papers are more absorbent and the inks spread out more readily, lowering the density via a process known as dot gain.

Surface Texture

There is a myriad of textures available on the market today, ranging from highly glossy, to very rough and textured. Your subject matter and mood will determine the best paper texture. Again, only printing an image on multiple papers will clarify what works best.



Tribute to Shorty – Goldwell Open Air Museum, Rhyolite, Nevada –Printed on Hot Press Natural Cotton Paper

A Word About Print Permanence...

One of the most important characteristics used in paper selection is print permanence.

This simply refers to the longevity of the print using a specific printer, ink and paper combination under given display conditions. Preservation issues should be of paramount concern to any printer, especially if the artwork is sold to collectors or museums. Prints should never be displayed in direct sunlight, or subject to high humidity or extreme temperatures. If not coated with a protective varnish, they should be matted and displayed behind conservation glass.

A very useful site for detailed brand-name specific permanence data for inkjet printers and papers is [Wilhelm Imaging Research](#). Co-founders Henry Wilhelm and Carol Brower Wilhelm conduct research on the stability and preservation of traditional and digital color photographs and motion pictures.

SAMPLE IMAGES AND MY PERSONAL PAPER CHOICES

In this final section, I will show some of my images along with information on which paper I would select to print them. Again, this is a personal artistic choice and I highly encourage experimentation. This is only a loose guide as to the reasoning behind my own preferences.

Let's begin with *Theater of the Desert*, an HDR image taken inside the historic Amargosa Opera House in Death Valley Junction, California. Owner and artist Marta Beckett spent many years painting murals on the theater walls. Therefore, to maintain the painterly look, I would print this image on a smooth (hot press) cotton paper such as Pura Smooth or Optica One. I would avoid a paper with a rougher surface texture so it does not compete with the exquisite wall murals.



Theater of the Desert – the Amargosa Opera House

A popular technique in photography today is texture blending – the blending of one or more textures onto a base image. These textures mainly consist of photographs of natural matter such as chipped and peeling paint on a wall, water, clouds, rocks, grungy surfaces, grass and a myriad of other substances. The image below, *Angel of Death*, was taken at a cemetery in Guadalupe, California.

I blended a bokeh texture into the image to simulate rising spirits. Due to the ethereal, spiritual feel of this image, I would most likely print it on a cold press paper such as Pura Velvet or Elegance Velvet to bring out the texture of the angel statue and add some texture to the skybound white balls of light. This image would also print well on canvas.



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Angel of Death

The image below, *Killer Truck*, was taken in the ghost mining town of Ballarat, California, just outside Death Valley National Park. This truck once belonged to the Charles Manson family of murderers, thus the image title. Due to the metallic content of the truck, this image would work very well on a metallic paper, although it could be argued that any glossy substrate would work.



Killer Truck

Below is another image with lots of metal, *Death by Desertion*, of abandoned train cars in the Arizona desert. Therefore, I would print this image on a metallic photo paper such as Breathing Color's Vibrance Metallic to convey the reflections in the metal and highlight all the important details.



Death by Desertion

Let's take a look at two black and white toned images below. The first, *Time Robber*, depicts the abandoned Cook Bank building in the ghost mining town of Rhyolite, Nevada. Due to the need for a high DMax and smooth tonal transitions, I would choose a fiber-based baryta paper for the image. Matte papers have lower DMax values and do not maintain sharpness like photo papers due to dot gain. I want to be sure to bring out all the details in the ruins of this historic bank building.



Time Robber

The next image, *Escher's Tower*, is of a sugar beet processing tower on the grounds of an abandoned sugar mill. I would either print this image on a baryta paper or metallic paper due to the metal in the tower. This one is a toss up.



© Renée M. Besta

Escher's Tower

One of my favorite subjects to photograph are night skies. In recent years I have been practicing light painting on foreground subjects while shooting star points, star trails, or the Milky Way in the night sky.

The details in the sharp crisp stars would obviously be lost on a matte or canvas paper; therefore, I print all of my night sky images on baryta or metallic papers. The image below, *Stars Over Our Lady*, depicts a Catholic church in the tiny town of Bradley, California. I printed this one on a baryta paper, as I did not feel metallic paper worked well with the light-painted adobe church or statue of Our Lady of Guadalupe.



Stars Over Our Lady

CONCLUSION

In summation, I sincerely hope these examples help you in choosing the right paper for your artwork. Although the choices are many, only you – the artist – can determine what

components of the image are most important as well as the mood you wish to convey to the viewer via your print. Images are filled with emotion and details. While some scream out for attention, others are very subtle. Various paper textures can either complement or get in the way of your image.

On a final note, if I feel an image does not render well on a particular substrate, I simply do not offer it regardless of what I think the “market” may want. That is a rabbit hole from which there is no escape.

Want to have this guide on hand for reference later on or to print at home? Click the below link to get the downloadable PDF version of this article!



Renée Besta is a fine art photographer and printer, digital imaging and graphics instructor, graphic designer, and exhibit producer who has been avidly engaged in the art form for over 35 years.

For more info on Renée you can check out [her website](#).
