Epson Guide to Superior Print Quality
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Superior Print Quality Made Easy
When you want to make the best possible impression, superior print quality is a must. Achieving superior print quality is easy. All you need is the right input, combined with the right printer, inks and paper for the job. Over the next few pages, we’re going to demystify the technology behind superior print quality and show you why we think Epson ink jet printers are your best choice. We’ll take a look at Epson’s ink jet printer line, and give you tips for choosing the best Epson papers and inks for your printing needs. We’ll also give you advice on choosing input devices such as digital cameras and scanners, as well as techniques for optimizing image files for the best possible output.

What Does Superior Print Quality Mean?
Superior print quality means documents that win business. Photos that win competitions. And personal projects that are admired by your friends and family. It means greater color accuracy. Better color saturation. Razor-sharp detail. Smoother gradations. And more accurate fleshtones. Below is an example that demonstrates the differences between just average print quality, and the superior print quality delivered by Epson ink jet printers.

Here’s an example of poor image quality. Notice how the colors are faded and muddy. There are lines across the photo known as banding. Edges are jagged. And, you can see the dot pattern that makes up the image.

Now here’s an example of superior image quality. The colors are vibrant and crisp. There is no banding, just one smooth, continuous tone. Edges are sharp and distinct. And, the dot pattern is "unvisible."
How Epson Ink Jet Printers Achieve Superior Print Quality

All EPSON Stylus® Color ink jet printers and EPSON Stylus Photo ink jet printers feature EPSON PerfectPicture Printing. This unique system includes five core technologies that enable Epson ink jet printers to produce industry-leading color output on all paper types and true Photo Quality prints. These technologies are high-resolution printing with variable dot size, optimized ink formulations, AcuPhoto Halftoning®, Micro Piezo® printheads, and genuine Epson papers. Let’s take a look at these technologies and how they work together.

1. High Resolution — dpi Is Just One Factor in Image Quality

Measured in dots per inch (dpi), print resolution actually refers to the number of points that the printer can place ink in a one-square-inch area. Dpi doesn’t refer to the actual number of dots printed since a printer will use only as many dots as may be necessary to produce a particular image. Nearly all Epson ink jet printers produce 1440 x 720 dpi output on all paper types, including plain paper. Some Epson ink jet printers offer even higher print resolutions. The EPSON Stylus C82 has an optimized resolution of 5760 x 1440 dpi — the highest in the industry. This high-level of resolution produces crisp text and line art and superior detail in prints.

But Dots Per Inch is Only Part of the Picture

Most printer manufacturers want you to believe that the higher the resolution, the better the image quality. In fact, the benefits of higher resolutions are less significant as the resolution exceeds 1440 dpi. At this point, the size of the dots has a greater influence on image quality than the resolution.

Large ink droplets enable faster print speeds but lower print quality because the large ink droplets are like wide paintbrushes. Very small ink droplets increase the detail in the print, but slow down the printing time because the printhead must deliver many ink droplets to cover a small area. Epson has developed a Variable Sized Dot Technology (VSDT) that enables the printhead to deliver a drop size that is optimized for the detail in the print.

Using Variable Sized Dot Technology, the Epson printhead delivers very small droplets when printing fine detail in the image and larger droplets when printing smooth gradations and large areas of solid color. The Variable Sized Dot Technology is an exclusive feature of EPSON Micro Piezo printheads that allows high-resolution printing and fast print speeds.
2. **Genuine Epson Inks — The Best Ink for the Job**

When it comes to ink, there is no “one-size-fits-all” solution. Different printing applications require different types of ink to produce the best print quality. That’s why Epson has developed a number of different ink formulations, each specifically designed to deliver the best image quality possible for your particular printing needs.

For printing applications requiring the highest level of print quality and greater durability, such as business documents, reports and newsletters, consider our DuraBrite™ Ink. Optimized for plain paper printing, DuraBrite Ink provides superb print quality, water-resistance and light-resistance of 80* years on specialty paper and 70* years on plain paper.

If you’re a professional photographer concerned with print longevity for portrait, fine art or personal photography printing, you’ll probably be most interested in our UltraChrome™ Ink. This pigment-based ink technology uses a 7-color printing system for superior photographic output on both Glossy Photo Papers and Matte Papers.

For indoor/outdoor signage, fine art reproduction, fine art photography, Print-for-Pay and other professional applications, choose our EPSON Archival™ Ink. Your output will not only look great, but will have a lightfastness rating of over 100 years*.

EPSON 6-color Photo Ink is your best choice for most photographic print applications. This dye-based ink system produces superior Photo Quality prints that look like traditional photographs, with sharp details, more accurate skin tones, smoother color transitions and the widest color gamut.

Designed for general purpose printing, our 4-color Dye Ink is ideal for everyday documents, photos and specialty output including iron-on transfers, transparencies and greeting cards. It offers the most flexibility as well as the largest selection of compatible media.

Now, let’s take a closer look at each ink formulation.
**EPSON DuraBrite™ Ink** — Offering a wide color gamut with superior stability, EPSON DuraBrite Ink uses a super-penetrating pigment based formula that delivers excellent print quality on plain paper. The ink particles remain near the surface, so light is evenly reflected across the page, resulting in a greater color range. Because DuraBrite Inks are comprised of insoluble particles, color remains within each particle for long-lasting results.

In fact, DuraBrite Inks have a light-resistance rating of 80 years on specialty paper and 70 years on plain paper*. They’re also water-resistant, which prevents accidental damage caused by moisture and spills. And they’re excellent for double-sided printing, because the inks don't smudge or bleed through.

With EPSON DuraBrite Ink, you get bold, black text, and rich, vibrant colors, for results you'll enjoy for years to come. It’s used in the EPSON Stylus C80 and EPSON Stylus C82 printers.

**EPSON UltraChrome™ Ink** — Ideal for photography and graphic art applications, EPSON UltraChrome Ink offers a superb color gamut which approaches that of dye ink, but with the water- and fade-resistance of pigment ink. The secret? Our Micro Encapsulation technology coats each ink particle with a special resin for long-lasting prints.

But what really makes EPSON UltraChrome Ink unique is that it uses a 7-color palette — the six colors used in 6-color ink jet printing (Black, Yellow, Cyan, Light Cyan, Magenta, and Light Magenta) plus Light Black.

The use of Light Black improves tonal quality in the midtones and shadows for more subtle shading and improved gradation quality. The addition of Light Black ink also improves monochrome prints, giving you greater control over the “warmth” or “coolness” of the print.

The UltraChrome Ink system also offers an optional Matte Black ink cartridge, for perfect prints with even better contrast and a higher optical density when printing on matte and fine art papers. It’s used in the EPSON Stylus Photo 2200, the EPSON Stylus Pro 7600 and the EPSON Stylus Pro 9600.
Achieving Superior Print Quality

EPSON Archival™ Ink — For heirloom quality photos, signage and fine art prints that look great and will last for generations, this is the ink to choose. EPSON Archival Ink features our Micro Encapsulation technology which coats each ink particle with an acrylic polymer resin. This coating allows ink particles to be more evenly distributed over the media, producing great photo quality from mattes to high-gloss prints.

Plus, while conventional pigment inks lie on top of the paper’s surface and are easily smudged, scratched or damaged, EPSON Archival Ink penetrates into the coating of our specially designed matte and glossy papers. The result? Durable, lightfast, true Photo Quality prints with lightfastness ratings of over 100 years.* It’s used in the EPSON Stylus Pro 10000 and EPSON Stylus Pro 2000p.

EPSON Photo Ink — This 6-color dye-based ink system uses the standard Cyan, Magenta, Yellow and Black inks as our 4-color dye system, but adds two light density inks: Light Cyan and Light Magenta.

The use of six inks reproduces more accurate and subtle transitions in color (also referred to as color gradations) for photos with more realistic skin tones, the widest color gamut, plus perfect highlights and shadows.

The light density inks are much less visible to the human eye, so photo prints are virtually continuous tone and dot-free, just like photo lab prints. EPSON Photo Ink offers a lightfastness rating of up to 25 years* and is water-resistant when used with certain Epson papers. It’s used in most EPSON Stylus Photo printers.
EPSON 4-Color Dye Ink — Used in some EPSON Stylus Color and EPSON Stylus C series printers, these specially formulated inks penetrate the paper surface and dry almost instantaneously. As a result, the ink drops stay sharp, separate and in perfect shape, ensuring vibrant colors and crisp, laser-quality black text without bleeding.

The standard 4-color palette uses Cyan, Magenta, Yellow and Black inks. But unlike some competitive 4-color ink systems, EPSON 4-color ink uses true black ink, instead of composite black (made by mixing Cyan, Magenta, and Yellow). The use of true black ink makes for sharper text, more true-to-life color, and greater contrast in photos.
## Achieving Superior Print Quality

### Key Differences

<table>
<thead>
<tr>
<th>Target application</th>
<th>DuraBrite™ Ink</th>
<th>UltraChrome™ Ink</th>
<th>Archival™ Ink</th>
<th>6-Color Photo Ink</th>
<th>4-Color Ink</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Optimized for plain paper printing and long-lasting output</td>
<td>Archival Photo-Quality prints, graphic arts posters, pre-press proofing, and both color and black and white photography</td>
<td>Indoor/outdoor signage, fine art reproduction, fine art photography, and Print-for-Pay</td>
<td>Best-looking photos</td>
<td>General purpose printing</td>
</tr>
</tbody>
</table>

### Supported Epson printers

<table>
<thead>
<tr>
<th>Color gamut</th>
<th>EPSON Stylus C80/C82</th>
<th>EPSON Stylus Photo 2200 and EPSON Stylus Pro 7600/9600</th>
<th>EPSON Stylus Pro 10000, EPSON Stylus Pro 2000p</th>
<th>Most EPSON Stylus Photo printers</th>
<th>Some EPSON Stylus C Series and Stylus Color Series printers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wide gamut on plain paper and matte papers; good on glossy photo papers.</td>
<td>Revolutionary pigment ink nearly equal to 6-color dye photo ink. Optional matte black ink for maximum density.</td>
<td>Good color gamut on recommended papers. Not recommended for black and white prints.</td>
<td>Widest gamut with smooth tonal gradations and dotless highlights.</td>
<td>Dye based inks offer the most flexibility as well as the largest selection of compatible media.</td>
<td></td>
</tr>
</tbody>
</table>

### Type of ink

<table>
<thead>
<tr>
<th>Supported Epson printers</th>
<th>Pigment CMYK</th>
<th>Pigment CcMmYKk</th>
<th>Pigment CcMmYK</th>
<th>Dye CcMmYK</th>
<th>Dye CMYK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light-resistance *</td>
<td>Up to 80 years (specialty paper)</td>
<td>Up to 75 years (specialty paper)</td>
<td>Over 100 years (specialty paper)</td>
<td>Up to 25 years (specialty paper)</td>
<td>Not Rated</td>
</tr>
<tr>
<td>Water-resistance</td>
<td>Yes, on all media including plain paper</td>
<td>Yes, on all supported papers</td>
<td>Yes, on all supported papers</td>
<td>Yes, on EPSON glossy photo papers</td>
<td>Yes, on EPSON glossy papers</td>
</tr>
</tbody>
</table>

### Supported papers

<table>
<thead>
<tr>
<th>Supported papers</th>
<th>Best Quality</th>
<th>Good Quality</th>
<th>Not supported</th>
<th>Good Quality</th>
<th>Good Quality</th>
</tr>
</thead>
</table>

* Lightfastness ratings based on accelerated testing of prints on Epson special media, displayed indoors, under glass on specialty papers. Actual print stability will vary according to image, display conditions, light intensity, humidity, and atmospheric conditions. Epson does not guarantee longevity of prints. Ratings do not estimate the durability of the paper itself. For maximum print life, display all prints under glass or laminations or properly store them.
3. **AcuPhoto Halftoning® — Smoother Gradations and More Accurate Color**

One of the most important determiners of output quality is the printer driver—the software that tells the printer what to print and how. This brings us to the fourth component of EPSON PerfectPicture Printing—EPSON AcuPhoto Halftoning technology.

AcuPhoto Halftoning technology combines precise color look-up tables with high-definition halftoning algorithms to deliver accurate colors in print that look better than traditional photographs.

As you can see in the side-by-side comparison, with AcuPhoto Halftoning, colors are sharper and details are crisp, while the image printed without AcuPhoto Halftoning is dull and fuzzy.

![Without AcuPhoto Halftoning](image1)  ![With AcuPhoto Halftoning](image2)

4. **EPSON Micro Piezo® Technology**

At the heart of the PerfectPicture Printing system is Epson’s Advanced Micro Piezo printhead. The ink dots created by EPSON Micro Piezo printheads are the smallest in the industry. These microdots are also far more accurate and perfectly formed than the ink droplets produced by the thermal ink jet technology found in
other, less sophisticated ink jet printers. In addition, Micro Piezo technology eliminates the problems of misting and satellites (small, unwanted droplets) common to thermal ink jet technology. The result? Sharper images and higher quality, more accurate output.

5. Epson Papers – The Perfect Match for Epson Inks
Genuine Epson papers and inks have been engineered to give you amazing Photo Quality images from your Epson ink jet printer. The special coatings on the paper allow for high resolution printing and prevent bleeding and over-saturation, resulting in sharper, more vivid prints. Epson offers a wide range of photo papers, everyday papers, specialty papers and professional papers, in a variety of sizes, configurations and finishes, to meet various applications and printing needs.
The Ins & Outs of Input Devices
If you want superior output quality, it helps to start with superior input — whether you're capturing images with a digital camera, scanning graphics, film or transparencies, using digital images from a photo CD, or printing a file you've received via email. In this section, we’ll look at the different ways of capturing images, offer advice for choosing digital still cameras and scanners, and give you some tips for optimizing image files to achieve superior print quality.

What to Look for in a Digital Camera
Digital cameras are more popular than ever. And with good reason. As the technology improves they’ve become smaller, easier to use, and much more affordable. If you’re thinking about buying a digital camera, here are some things to consider.

**Resolution** — With digital cameras, resolution is described in pixels – the dots that form a picture on the screen. There are cameras on the market with resolutions from 640 x 480 pixels to 2048 x 1536 pixels or more, usually measured in Megapixels (millions of pixels). Resolution is closely linked to price, so if you're considering a purchase, choose a camera that has at least 1280 x 960 pixels in resolution. If you buy a lower resolution digital camera, you may be disappointed in the quality of your printed photos.

<table>
<thead>
<tr>
<th>Camera Resolution</th>
<th>What size you can print at good quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3 Megapixels (640 x 480)</td>
<td>Not good for printing</td>
</tr>
<tr>
<td>1.2 Megapixels (1280 x 960)</td>
<td>4&quot; x 6&quot;, 5&quot; x 7&quot;</td>
</tr>
<tr>
<td>2.1 Megapixels (1600 x 1200)</td>
<td>5&quot; x 7&quot;</td>
</tr>
<tr>
<td>3.3 Megapixels (2048 x 1536)</td>
<td>8&quot; x 10&quot;</td>
</tr>
</tbody>
</table>
PRINT Image Matching™ Technology — Developed by Epson and leading digital camera manufacturers, PRINT Image Matching, or P.I.M., is a revolutionary new technology that ensures digital cameras and printers work together to produce photographs that print truer-to-life than ever before.

Before P.I.M., digital camera users often found it difficult to achieve consistent, accurate photo prints from their digital camera images. The main reason for this is that most digital cameras are limited to a smaller color space than is available on quality ink jet printers like the EPSON Stylus Photo line. P.I.M. technology enables digital cameras to access this greater color space, set print gamma, and optimize images for printing automatically. When images captured with a P.I.M.-enabled camera are printed on a P.I.M.-enabled printer (such as the EPSON Stylus Photo 825) the result is vibrant color output that more accurately matches what you saw through your camera’s viewfinder. P.I.M. technology is implemented through your computer using software. Or it can be used without a computer, when printing directly from P.I.M.-enabled Epson photo printers.

All of these leading digital camera makers are P.I.M. partners and many have adopted P.I.M in their newest camera models:

EXIF — EPSON Stylus Color printers are EXIF-enabled.
What to Look for in a Scanner

Scanners offer an easy, affordable way to turn paper photos into digital images you can enhance, print, send by email, or post on the Web. When choosing a scanner, the two specifications you want to look at are scanning resolution and color bit depth.

**Resolution** — If you simply want to print family snapshots or craft projects, a 600 x 2400 dpi scanner will most likely be sufficient for your needs. However, if you want to do more creative projects, higher resolution will give you greater creative control and more enlargement options. For example, with a 1200 x 2400 dpi scanner and a transparency adapter, you can take a 35mm negative and create a Photo Quality 3" x 5" print on your ink jet printer.

With newer scanners that offer 2400 x 4800 dpi and higher resolutions, you can output beautiful 8" x 10" prints. Plus, many of the latest flatbed scanners have a transparency adapter built into the lid, making it even easier to create stunning prints from slides.

**Bit Depth** — Bit depth is another important consideration when choosing a scanner. Bit depth refers to the range of color that can be captured in a given pixel. Higher bit depth translates to greater color sensitivity. In general, scanners with higher bit depths tend to produce better color images. A scanner with 24-bit color is okay for scanning photos. If you can afford it, 48-bit color is best. Keep in mind that higher bit depth scanners can capture more colors, but they require software capable of handling the larger color palette.
Why Images Look Great On-Screen but Sometimes Print Poorly

These days, it’s common for digital photos to be sent over the Internet in an electronic format. Typically, they’re jpg files which have been compressed for faster transmission. Unfortunately, even if the images look great on-screen, they may print poorly. That’s because an image can look perfectly fine at 72 dpi on your computer’s monitor, but needs to be at least 300 dpi to print properly.

Additionally, most computer monitors are not professionally calibrated. The result? The color you see on your monitor may not exactly match the color in your printed photo. The printer bases its color output on the information contained in the image’s data file. To really ensure “what you see on your monitor is what you’ll get when you print” you should have your monitor professionally calibrated using a color match system.

The table below is a rough guideline to determine what print size you should choose for best quality output based on the file size of a .jpeg image file.

<table>
<thead>
<tr>
<th>Size of jpeg file</th>
<th>4&quot; x 6&quot; print</th>
<th>5&quot; x 7&quot; print</th>
<th>8&quot; x 10&quot; print</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 KB</td>
<td>OK</td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td>250 KB</td>
<td>Good</td>
<td>OK</td>
<td>Poor</td>
</tr>
<tr>
<td>500 KB</td>
<td>Good</td>
<td>Good</td>
<td>OK</td>
</tr>
<tr>
<td>750 KB</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
</tr>
</tbody>
</table>
The Truth About Megapixel Printers

Some ink jet printers are being marketed as “5.76 megapixel printers”. To get this number, they multiply two dpi specifications (4800 x 1200 = 5,760,000). This marketing trick is confusing and misleading. Printer dpi is very different from digital camera pixels. (See page 4, “High Resolution — dpi is Just One Factor in Image Quality” for more information.) Each pixel in a digital camera contains millions of colors. But, ink jet printers currently print with up to 6 colors. So you can’t compare dpi to pixels. All Epson printers have more than sufficient resolution to output images from any digital camera, from the lowest resolution to the highest resolution that exists today or in the near future. The key is knowing at what sizes you can reasonably print as described earlier in this document.
Key Points to Remember

✔ Superior print quality is the result of choosing the best printer, ink formulations, good input and the right paper for your particular print application.

✔ Higher resolution doesn’t necessarily mean better output. Resolution is just one factor in image quality. Ink droplet size also affects image quality. Printers that use different-sized ink droplets, like EPSON Stylus printers, can actually produce better quality prints than those with a higher resolution.

✔ Epson offers a number of ink formulations, each designed for specific print applications:

<table>
<thead>
<tr>
<th>EPSON DuraBrite Ink</th>
<th>Optimized for plain paper color printing. Light- and water-resistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPSON UltraChrome Ink</td>
<td>Archival photo quality for signage, graphic arts, pre-press proofing, portrait and commercial photography</td>
</tr>
<tr>
<td>EPSON Archival Ink</td>
<td>Fine-art archival printing for indoor/outdoor signage, fine art reproduction, fine art photography, Print-for-Pay</td>
</tr>
<tr>
<td>EPSON 6-color Photo Ink</td>
<td>Best quality photos</td>
</tr>
<tr>
<td>EPSON 4-color Dye Ink</td>
<td>General purpose color printing</td>
</tr>
</tbody>
</table>

✔ Printer drivers are one of the most important determiners of print quality. Epson AcuPhoto Halftoning technology creates the most realistic detail and accurate colors. The result? Prints that more closely match your original images.

✔ EPSON Micro Piezo technology produces consistent ink droplets, with no misting or satellites, for sharper images, higher quality output and printer dependability.

✔ Genuine Epson papers are engineered to deliver top quality output when used with Epson inks. We offer a wide variety of papers designed to meet specific printing applications.
The most important consideration when purchasing a digital camera is resolution. The higher the resolution, the better the image quality. Choose a camera that has a resolution of at least 1280 x 960 pixels.

When choosing a scanner, pay particular attention to the scanning resolution and color bit depth. If you want to enlarge transparencies and photos, look for a scanner with a resolution of at least 1200 x 2400 dpi. A 24-bit scanner is adequate for scanning photos, but for top quality color prints, a 48-bit scanner is best.

When printing photos from image files, print quality is determined by the size of the file and the size of the print you want to create. Larger file sizes give you more options, allowing you to output larger prints without sacrificing print quality.
Epson Web Sites

Epson America, Inc.
For more information on Epson products and technologies, visit http://www.epson.com

EPSON PhotoCenterSM
Have more fun with your photos! Created especially for photography enthusiasts, this FREE site offers you a variety of fun and innovative ways to organize, print and share your photos over the web. Sign up for your FREE membership at http://photo.epson.com

PRINT Image Matching
For more information about PRINT Image Matching technology — what it is, how it works, and what printers, cameras and software programs are P.I.M.-compatible, visit http://www.printimagematching.com

Epson Phone Numbers

Epson America, Inc.
1-800-463-7766

EPSON ConnectionSM Technical Phone Support
U.S.: 562-276-1300
Canada: 905-709-9475

EPSON Connection Pre-Sales Support
(for your nearest dealer location)
U.S. and Canada: 800-463-7766
or 800-GO-EPSON