



Universal Quick Guide

Main Principles

- Digital images should look the same as they transfer between devices, platforms and vendors.
- Digital images should be prepared in the correct resolution, size and sharpness for the device(s) on which they will be viewed or printed.
- Digital images should have embedded metadata that conform to the [IPTC](#) and [PLUS](#) standards, making them searchable while providing relevant rights and usage information – including creator’s name, contact information and a description of licensed uses.
- Digital images should be protected from accidental erasure or corruption and stored carefully to ensure their availability to future generations.

1. ICC Color Management

ICC profile-based color management defines color information in standard terms necessary for proper reproduction of images. Monitors, printers, scanners, and ideally, cameras should be profiled. Working and output spaces – such as Adobe RGB, sRGB, SWOP CMYK, (etc.) – should be embedded and preserved when opening files.

2. Monitor Calibration

Monitors should be calibrated and profiled with a hardware device. Visual calibration is not adequate for professional image editing. An accurate visual representation of the image is extremely important to the imaging process. Calibration standards range from:

- Gamma — 1.8 to 2.2 (or L*).
- White point — 5000K to 6500K.
- Brightness levels — 80cd/m² to 140 cd/m².

As a general calibration guideline, use gamma 2.2 and 6500K for both Windows and Mac. A white point of 5000-5500K is a common recommendation for offset printing. Set brightness levels in relation to the room’s ambient lighting.

A calibrated and profiled monitor, in conjunction with good print profiles, will allow you to “soft proof” the intended output. A daylight (5000K/D50) light source at correct brightness is necessary to visually match monitor to print.

3. Color Space

Camera settings for color space can be critical when capturing TIFF or JPEG files. For raw image capture, it makes little difference how you set the in-camera color space, since you can set it just as effectively during postproduction. It's generally better to choose a large-gamut space – such as Adobe RGB (1998), ECI-RGB or ProPhoto RGB – for JPEG and TIFF captures, and for image editing. It may be convenient to capture images in a narrow-gamut space, such as sRGB, if the pictures will not require color correction or tonal editing and you intend the images for web or sRGB lab prints. Note, however, you can convert a wide-gamut image to a narrow space such as sRGB, while a narrow-gamut image converted to a wide space will not (re)capture the colors of the wider gamut.

Offset printing requires image files saved in a CMYK color space, which has a very different and narrower gamut than digital image files captured in RGB color. A good CMYK conversion requires both expertise and knowledge of the specific press and paper type. Simple mode conversions in Photoshop are not recommended.

Photo lab prints often require the sRGB color space. However, some labs may have a specific color profile, either for embedding in the file or for use in soft proofing.

4. Resolution

Describe resolution of digital images either by pixel dimensions (width x height) for screen use or by physical size and resolution for print use. Express image resolution as pixels per inch (ppi), pixels per centimeter (ppc) or pixels per millimeter (ppm). But note resolution is only relevant when paired with output size (e.g., 8x10 inches at 300 ppi). Here are recommendations for common uses:

- Inkjet prints: 180 to 360 (some say up to 480) ppi.
- Continuous-tone printing: 240 to 400 ppi.
- Offset printing: 300 ppi is often specified, but resolutions of 1.3- to 2-times the halftone screen ruling are considered safe. This means 195 to 300 ppi for a 150-line screen. Newspapers usually print with 85- to 100-line screens, requiring – at most – images at 170 to 200 ppi.

5. File Formats

The best quality comes from capturing and editing in a raw file format. The advantages of raw file formats are: choosing color space when the file is processed; greater bit depth; the ability to adjust white balance, saturation, exposure (to a degree) and tonal characteristics; adjustable noise reduction; and correction for lens aberrations – all in a non-destructive manner. Raw files may be processed in a variety of software, from the camera maker's own to many third party products, and even by using the built-in raw processing of Apple and Windows operating systems. Converting raw files to DNG format is considered an excellent method for archiving raw files. DNG was designed as a more universal file format than camera-specific raw formats such as NEF or CR2.

File formats include: lossy compression types such as JPEG; lossless compression types such as LZW compressed GIF and TIFF, PSD and most raw file formats; and uncompressed types such as standard TIFFs. Some formats, such as JPEG2000 and HD Photo (JPEG XR), offer both lossy

and lossless compressions. For the web, use JPEG. For printing, uncompressed TIFF is often preferred, although high-quality JPEGs (Level 10-12) can be visually indistinguishable from TIFFs, and some printers prefer their smaller file sizes.

6. Naming Files

To avoid problems with files transferred across computing platforms, name files with only the letters of the Latin alphabet (A-Z, a-z), numbers, hyphens and underscores. Do not use other punctuation or symbols. Keep the full name to 31 characters or less, including its three-letter extension. Use file names that will not be duplicated. Multiple files with the same name cause problems for computers and people alike. Including the numeric date and the photographer's name is an excellent method for creating unique names.

7. Sharpening

Capture sharpening compensates for the loss of detail that occurs during any digital capture process. TIFF and JPEG capture allows for sharpening in camera or during postproduction. Sharpen raw files during postproduction. Do not sharpen heavily early in the image-editing process.

Process sharpening counters the loss of detail in the post-production process. Process sharpening is also used for creative effect. Perform it after color and tone correction, retouching, image sizing, etc. or for creative effect. The goal is an image that is acceptably sharp, but never over-sharpened.

Output sharpening should be specific to the final output size and the output system (printing device, paper, ink, etc.) and applied only as a final step before output. It is important to communicate when delivering whether output sharpening has been applied.

8. Metadata

EXIF, IPTC, IPTC Core Schema and PLUS are the current standards for embedding metadata in image files. Embedded metadata should include creator and copyright information, as well as searchable keywords and license information. Including useful and relevant information in metadata adds value to an image.

9. File Delivery

Digital image files may be delivered on a variety of removable media, including hard drives, CD-Rs and DVD-Rs. Do not use adhesive labels on optical media, since they may separate and damage an optical drive. Printing directly on inkjet-writable or LightScribe media CD-Rs or DVD-Rs is a good way to provide information such as your copyright, usage license, file lists and disclaimers. For speed and convenience, deliver by FTP or e-mail. All image files should have embedded metadata. (For proprietary raw files, the safest route is to include the metadata in an XMP sidecar file.) Image file delivery should include ReadMe files.

NOTE: Provide a *ReadMe* file in PDF, HTML or TXT format with all files delivered for output. Such files should specify image size(s), color space(s), the copyright owner's contact information, any licenses granted, (or PLUS code) and if certain rights are being withheld, the words "other uses, reproduction or distribution are specifically prohibited." The ReadMe file should also include disclaimers noting recipients are responsible for following ICC-based, color-management workflows.

10. CMYK Guide Prints and Verifiable Proofs

CMYK guide prints and verifiable proofs can serve as valuable reference points for digital files, especially if the recipient is unknown or the output profile generic. Creating CMYK guide prints and verifiable proofs that accurately represent offset CMYK printing requires knowledge of printer profiles and color management. Clearly convey the method used to produce the guide print.

11. Archiving

It is important to address the issue of who will archive digital image files. Basic decisions include what kinds of files will be archived and how the archives will be protected from format obsolescence and media failure.

12. Digital Image Workflow

No single workflow suits all photographers and all clients. A good digital workflow is the most efficient and automated way to get the job done. It should satisfy the clients' needs, embed necessary information (metadata), embed color profiles, and automate the archiving and backup of files. A good workflow saves time and protects against losing images and the work performed to optimize them. Many software packages can be part of a digital workflow. New programs appear regularly, some aiming to be all-in-one solutions. You will need to test to see which program or programs give you the right combination of metadata handling, efficiency, speed and image quality.

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