



# Digimarc Validate

## **Best Practices Guide**

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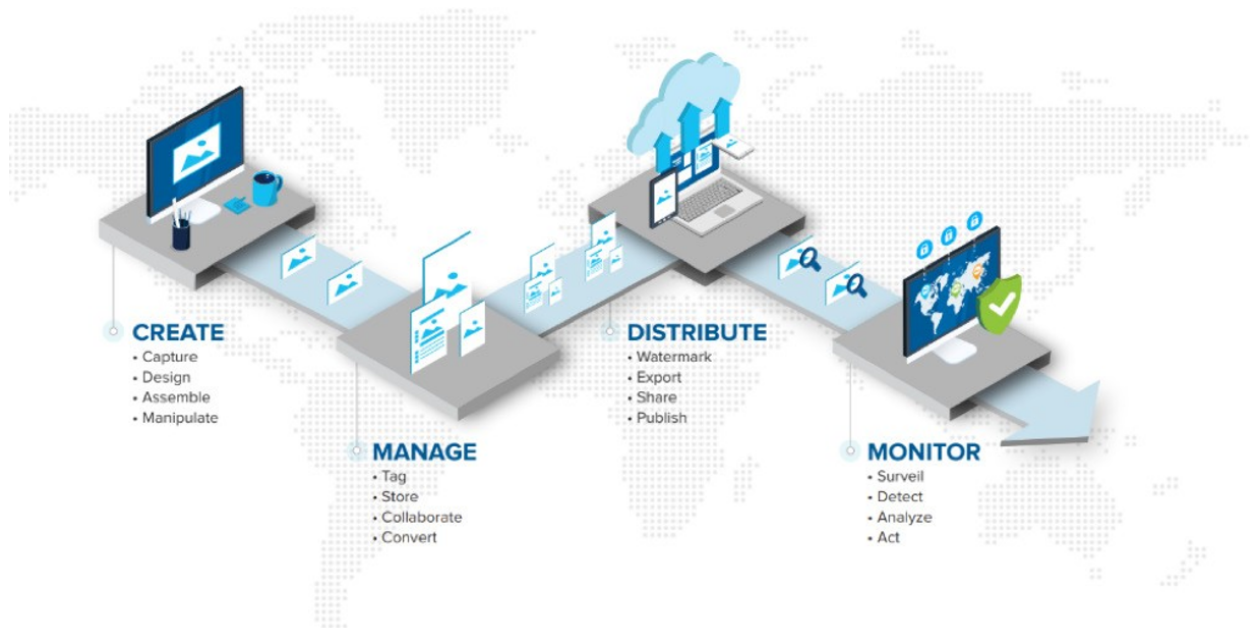
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## Introduction to Digimarc Validate

Digimarc Validate is a powerful digital image watermarking solution enabling brands, rights holders, and digital-asset managers to better manage the use of images and other assets throughout the supply chain and across the public internet. Combining imperceptible identifiers with complementary crawl services, enterprise customers benefit from greater insight into where brand assets are being used.

This guide outlines how to effectively work with Validate so the watermark remains effective through file compression, format changes, editing, cropping and other manipulations. The process of applying a digital watermark is often called enhancement.

### The Image Journey



### Digital Watermark Strength

We add digital watermarks that are mostly imperceptible to the human eye and persist with your image regardless of what happens to it or where it lives. Durability and visibility of a digital watermark are directly related. An increase in watermark durability increases the strength—and can, in some cases, increase the visibility of the watermark.

### What Types of Images Can Be Digitally Watermarked?

Virtually all images can be digitally watermarked; however, some types yield better results than others. See File Formats for more information.

### What Types of Images Can't Be Digitally Watermarked?

Digital image watermarking uses color space (a specific organization of colors) within an image's pixels to apply its payload. Some image types contain no color space, so must be converted prior to applying a watermark.

### Bitmap Vs. Vector

Vector or line-art images aren't supported, but can be converted to a raster or a bitmapped format prior to enhancing.

### Very Small Images

We don't recommend using Validate to apply watermarks to images smaller than 256 x 256 pixels.

## **Grayscale: Single Channel Vs. Truecolor Monochrome**

Grayscale image compatibility varies based on the format of the image. Many grayscale images are truecolor monochrome, meaning the image has color space into which our watermark payloads can be applied. However, many formats, JPEG included, tend not to store the actual color values in each pixel; instead, they create a palette of shades from the original image. These kinds of “palettized” images aren't supported.

## **True Black And White**

True black-and-white images aren't supported. A true black-and-white image, also called 1-bit color, is common in faxes, scans, and some kinds of print images. These images contain no color space or shades of gray into which a watermark payload can be applied.

## Color Space

The watermarking process places a digital watermark in either the chrominance (chroma) or luminance (luma) component of an image. Our watermarking tools provide you with two options to optimize the watermark based on the color space of your image. A chroma watermark is preferable for color images. A luma (or "Classic" in Adobe™ Photoshop™) watermark is ideal for grayscale images.

The Validate application defaults to using the chroma digital watermarking mode. You can configure it to apply luma watermarks instead, if desired.

### When to Switch from Chroma to Luma Watermarks

We recommend chroma watermarks for all full-color images. The improved visual quality and durability, especially after scaling and JPEG compression, are significantly better. In most instances, the default chroma setting will yield the best results. However, there are some situations where you might want to switch to the luma watermark, such as for images with mostly or entirely flat colors; for example, a pair of sunglasses on a white background.

Depending on the type of images you're watermarking, you might find the visual artifacts of the chroma watermarking mode to be more visible than the luma mode. Validate can switch between modes based on user preferences.

## File Formats

A digital watermark is woven into and carried by the pixels that make up an image and survives even when the image is converted from one file format to another. The file formats into which you can add a Digimarc watermark vary for each of our watermarking tools.

## Image Variations/Randomness

Digital watermarks are most effective and least perceptible when applied to images that aren't composed, mostly or entirely, of a single flat color. Images that contain some degree of variation or randomness yield better results.

We recommend applying a chroma watermark to normal, high color/variation images; for example, a full-color, staged image of a handbag on a model. Luma watermarks work better when applying to mostly or entirely flat-color images; for example, a pair of dark running shoes against a white background. Note that watermarks can be slightly more visible on images that are mostly or entirely composed of a single flat color.



**Use the chroma watermark when enhancing normal high-color images**



**Use a luma watermark when enhancing images with low color variation**

## Image Size Recommendations

To add a digital watermark into an image and be able to reliably read it later, digital watermarks require a minimum number of pixels with which to work.

We recommend a minimum size of 256 x 256 pixels. There is no upper limit on image size for digital watermarking (see Survivability of a watermark for best practices).

## Image Workflow Overview

As you prepare an image for distribution, you might take it through a number of different transformations. You might save the image in multiple resolutions and perform edits as outlined in [Survivability of a watermark](#), such as scaling, cropping, rotation, compression, and so on.

### Where and When in Your Workflow to Digitally Watermark Images

Whether you're enhancing images individually or processing at scale through a Digital Asset Management (DAM) platform, we recommended the following workflow sequence for digital watermarking:

- 1 Make all necessary modifications to your image until it has the desired final appearance.
- 2 Save a final un-watermarked copy (you can't apply a watermark to an image that already contains one).
- 3 Apply the digital watermark.
- 4 Save the final image format.
- 5 Publish the image.

### Using the Watermark Durability Setting

A default watermark intensity setting of seven (7) is common across all of our watermarking software, though it can be altered within the configuration of each tool. The setting provides control between digital watermark robustness and visibility. However, this setting is by no means a “one size fits all” option.

The setting you choose depends on the intended use of the image and on the balance you want between watermark robustness versus visibility. For example, it can be quite acceptable to use a higher watermark durability setting with JPEG images posted on a website. The higher durability helps to assure the persistence of the digital watermark, and the increased visibility will most likely not be noticeable with medium-resolution JPEG images.

Digimarc recommends that you try various digital watermark durability settings as part of your testing process to see which setting works best for your images. The goal is to find the balance between visibility and durability that meets your needs.

### Image Compression

A digital watermark, in most cases, will survive image compression, but the survival is dependent on several factors. Lossless compression, such as with PNG, LZW, Stuffit™ and .ZIP formats, doesn't affect the survival of a digital watermark because no image data is sacrificed to create the compressed version. Lossy compression methods such as JPEG or indexed color formats actually remove image data in order to decrease file size; this can affect a digital watermark's durability. The following factors influence the impact of lossy compression:

- **Level of image compression** – Lossy compression degrades the image to some extent, though this is dependent upon the quality setting chosen when saving in compressed format; most digital watermarks will survive as long as a moderate level of compression is used (see [Survivability of a Watermark](#)).
- **Visibility/durability setting used when applying a digital watermark** – The higher the durability setting, the better the chances the digital watermark will survive compression. The visual quality of compressed images is somewhat compromised, so often a higher watermark durability setting is less noticeable.
- **Image size** – The greater the number of pixels in the image, the more the digital watermark can be repeated throughout it; the recommended minimum image size is 256 x 256 pixels.
- **Randomness of image data** – See [Image Variations/Randomness](#).

## DPI Settings

When digitally watermarking an image for use on the Internet, resample the image to the proper DPI (Dots Per Inch) setting for this medium (either 72 or 100 DPI) before you add the digital watermark. Correctly matching the digital watermark's DPI setting to the image's final resolution optimizes the durability of the information in the watermark.

## Resampling Images

In some situations, you might want multiple copies of an image at different sizes. For example, a small preview image is often used to link to a larger image for viewing.

This means conducting more digital watermarking operations than if you watermarked only once prior to resampling, but your digital watermarks will be much more durable using this approach.

When you're working with an image that you'll be resampling to multiple sizes, always resample before applying a digital watermark.



## Survivability of a Watermark

The factors that affect the durability of a watermark directly influence survivability of watermarks are:

- image variation
- watermark durability settings
- lossy compression

Survivability results will vary.

### Scaling

The original digitally watermarked image can generally survive being resized. Chroma mode watermarking typically survives being sized up to 200% or resized down to 25% of the original size, and in many cases even lower. Luminance (or “Classic”) mode watermarked images should be readable after being sized up to 200% or scaled down to 60% of the original.

### Cropping

Because the digital watermark is repeated throughout the image, removing portions of the image by cropping rarely affects the watermark, provided that the final image meets or exceeds the minimum size discussed above.

If the image is cropped to less than 256 x 256 pixels, the watermark might not survive.

### Rotation

The digital watermark remains intact when the image is rotated by any number of degrees.

### Effects Filters

The general rule is that the survival of the digital watermark is linked to the visual quality of the image. Some effects filters significantly distort pixels in the image, which has a direct impact on the strength of the watermark. If an effects filter is applied at an extreme setting (particularly distortion-type effects), then it is possible the digital watermark may no longer be readable from the image.

## Working with Layered Images

When working with an image that contains multiple layers, watermarking the image in that state would apply the digital watermark only to the selected layer, rather than to the entire image.

We recommend saving a separate copy of the layered file, then flattening the image before applying the watermark.

### **Combining Digital Watermarks with Visual Watermarks**

If you decide to use a visual watermark, be sure to apply the Validate watermark last. If done in the reverse order, the visual watermark could possibly disrupt a significant number of pixels, changing the image drastically and impacting the Validate watermark.