



## **Benefits of M-Color Plotting**

### **Comparison to AutoCAD's Plotting Features**

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# 1. Overview

M-Color is a presentation plotting software for AutoCAD users who routinely need to develop high-quality plots of their AutoCAD designs. Key benefits of using M-Color instead of traditional AutoCAD plotting include:

- Additional graphical effects to improve the appearance of your presentation plots.
- New publishing possibilities, including high-quality PDF, PostScript and bitmap exporting.
- Advanced previewing capabilities.
- Better plotting performance and smaller plot files.
- Dramatic increases in productivity through layer-based plot appearance settings and reusability.

M-Color bridges the gap between traditional AutoCAD drafting and presentation graphics software. You can use AutoCAD's precision drafting capabilities to create and edit your CAD drawings, and take advantage of the advanced graphical effects and publishing possibilities of M-Color to produce a high-quality presentation plot. M-Color is tightly integrated with AutoCAD so there is no need to import your AutoCAD drawing to some external graphics software and lose the editing link with AutoCAD.

The next chapters describe the benefits of using M-Color instead of traditional AutoCAD plotting in more detail.

## 2. Improving the Appearance of Your CAD Plots

M-Color helps you improve the appearance of your AutoCAD plots in many ways. For example, M-Color offers additional graphical effects not found in plain AutoCAD, such as a wide variety of translucent effects, hand-drawing effect and drop shadows.

Perhaps most importantly, the way you define plot appearance settings in M-Color is so much easier and more productive that you *can* produce a high-quality presentation plot without sacrificing project deadlines.

The following sections give some examples of the additional graphical possibilities M-Color offers.

### 2.1 Translucent Fills

M-Color supports the concept of *translucent colors*. Instead of using just solid color fills, you can fill objects with translucent fill styles, letting you see the details under the color fill. It is like placing a piece of colored glass on top of the other objects.

Shadows are one example of the many practical uses for translucent fills. Another key application is with aerial photographs: M-Color lets you make the color fills on top of aerial photographs translucent, allowing you to see the details of the aerial image through the highlighted area.

Raster images are smoothly blended into the background. With the new 8-bit alpha channel support you can add photos of trees, people, etc. that blend into your drawing perfectly. Even the actual contents of raster images can be made partially transparent so that the background still shows through. For example, you can add an image of a tree in front of a building and make the tree bitmap translucent.

You can use the translucent effect also for bitmap texture fillings and gradient fills. For example, imagine the possibilities of a gradient fill transitioning gradually towards transparency, showing fully only a part of the layer behind.

### 2.2 Bitmap Texture Fills

Another style type supported by M-Color is *bitmap texturing*. Using bitmap texture styles is just as simple as using solid color styles: just assign a bitmap texture fill style to a layer in M-Color, and the objects on that layer will be filled with the specified bitmap pattern.

Use bitmap texture fills to add liveliness to your CAD plots: grass, forest, granite and other textures are very useful in improving the appearance of site plans and elevations, for example. M-Color subscription customers receive a collection of more than 2,000 predefined bitmap textures that are easy to add to drawings.

You can rotate all texture bitmaps and adjust the color tone, contrast, brightness, intensity and saturation of texture fills. For example, you can make a wood texture darker by adding a touch of red.

### 2.3 Gradient Fills

M-Color provides you with several types of gradient fill styles. Plain AutoCAD includes some gradient filling capabilities as well, but they are not comparable with the gradient filling capabilities of M-Color. For example, the gradient hatching of AutoCAD is very heavy during plotting so it is not usable in a larger scale.

M-Color gives you more flexibility in defining gradient fills. You can adjust the center point of the gradients, specify edge padding, or use the unique adaptive gradient fill that follows the shape of the area being filled. This gradient effect is very useful especially in mapping and landscape planning purposes. You can also fill the area outside an object.

Most importantly, M-Color lets you control gradient fills on a layer-by-layer basis, without the needs to fill each object separately like in plain AutoCAD. See the Productivity chapter for more information.

## **2.4 Hand-drawing Effect**

A hand-drawn look adds a touch of personality to your drawings. You can use different effects (curve, deviate, move ends, break and vary width, multiple line segments) to make the drawing look like it was hand-drawn. This is an excellent feature for use in casting initial sketches from your designs, for example. Plain AutoCAD does not offer any such effects.

## **2.5 One-click Drop Shadows**

Adding drop shadows to text or graphics gives depth and flair to your layout. You can create drop shadows simply with the click of a button, then easily adjust the angle, distance, and feathering of the shadow. You can easily choose one layer and create drop shadows to all objects on that layer. With plain AutoCAD it is not possible to add drop shadows.

## **2.6 High-quality Fonts**

M-Color supports both TrueType and PostScript Type 1 fonts. M-Color lets you map AutoCAD's SHX text styles to high-quality TrueType or Type 1 fonts. This preserves fast regens in AutoCAD but considerably improves the appearance of your plots.

### **3. Publishing**

The requirements for publishing presentation plots are increasing all the time. It is not sufficient to just produce a few hardcopies of your drawing. You must be able to publish it in various formats. You may need to distribute the plots to your customers electronically, publish plots on the Internet, incorporate some of them in reports or other documents, or send the plots for final printing at a print house.

M-Color addresses all these aspects of publishing your presentation plots. And in all cases, quality and performance are of primary importance. The plots you make are often large and complex, and the software must be capable of dealing with that in all steps of publishing.

#### **3.1 PDF Files for Acrobat**

M-Color includes state-of-the-art support for PDF publishing. Creating PDF files from your presentation plots could not be easier: just click File / Publish to PDF to save your plot to the PDF format.

PDF has quickly become the de facto standard in electronic publishing. Unlike bitmap files, PDF files preserve the quality and details of plots, and anyone can view, zoom and print PDF files with the free of charge Acrobat Reader software. Most service bureaus and print houses accept PDF files.

The PDF engine of M-Color has been specifically designed for large and complex CAD presentation plots. The resulting files are small and efficient, and immediately ready to be distributed by e-mail, for example. Font embedding and other advanced features ensure that the only file you need to send is the PDF file itself – all associated information such as font definitions has been embedded into the PDF file. M-Color also supports PDF 1.5, including inclusion of your CFG layer information in the resulting PDF file.

#### **3.2 PostScript**

Saving your plots in the PostScript format is just as easy as using PDF. Click File / Publish to PostScript to produce a PostScript plot file. M-Color supports advanced Level 2 and Level 3 PostScript features, producing much smaller PS files than plain AutoCAD, for example. PostScript plot file sizes are reduced because M-Color bypasses Windows GDI in PostScript output.

With graphical effects such as gradient fills, the difference in plot file sizes between M-Color and plain AutoCAD can be quite dramatic, often making the PostScript printing of AutoCAD unusable for any larger plots. See the Performance chapter for more information.

PostScript is widely used in electronic publishing. For example, many print houses expect to receive PostScript files.

#### **3.3 Exporting to Bitmap Formats**

Bitmap formats such as JPEG and GIF are very useful when you need to publish your plots on the Internet. M-Color lets you save your presentation plots to all common bitmap file formats, including TIFF, GIF, JPEG and PNG.

M-Color is capable of producing high-resolution images also from the most complex color plots in just a fraction of a time. Advanced anti-aliasing techniques used by M-Color result in high-quality, crisp images. Standard AutoCAD offers some limited support for exporting drawings to bitmap formats, but the possibilities of controlling the output and the quality of the produces images cannot really be compared with M-Color.

## 4. Productivity

Professional AutoCAD users need to routinely develop presentation plots from their design projects. Productivity is of key importance. It is not possible to spend days struggling with the appearance settings of a single color plot. In the end, reusability, controlling the appearance of groups of objects together, and plotting performance are the features that define whether it is possible to produce high-quality presentation plots within project budget and schedule or not.

A primary design objective in M-Color has always been productivity. M-Color was not designed to be a tool for adding a couple of gradient fills to an AutoCAD drawing. Instead, M-Color has been designed to be a productive environment for producing high-quality presentation plots of real-world, large, complex CAD projects.

If you need to bring the drawings into Illustrator or Photoshop and add graphical effects such as translucent color fills, gradient color fills and drop shadows in those programs, you will have trouble when you make some changes to your original AutoCAD design. After that the work you did with Illustrator or Photoshop needs to be redone. With M-Color this does not happen so the productivity increases. With M-Color it is also much easier and faster to plot these large designs than, for example, with Photoshop that is fully bitmap based.

Productivity is clearly one of the most important differences when comparing the possibilities of plain AutoCAD and M-Color. The following sections give some examples of how the way M-Color works makes your work of preparing presentation plots more productive.

### 4.1 Layer-based Plot Appearance Settings

In plain AutoCAD, many plotting-related things must be managed on an object-by-object basis. While this is OK for simple test drawings, it falls short in real-world use. Unlike AutoCAD, M-Color emphasizes that the plotting appearance settings for the drawing must be made in a layer-based way. In M-Color, so called CFG layers group together AutoCAD objects (such as object on one or more AutoCAD layers, or objects having the same display color in AutoCAD). You control the plotting appearance of these objects by assigning a fill style, outline width and outline style to their CFG layer in M-Color – not to individual objects.

The difference in productivity becomes clear when you think about changing the appearance of filled objects: in plain AutoCAD, you might need to erase the solid hatching from hundreds of objects, and then reapply some other type of fill (e.g. a gradient hatching) to these hundreds of layers. And try to make sure that you do not forget to change any of those objects. In M-Color, all you would do is change the fill style of the CFG layer (e.g. from a solid color style to a gradient style). All objects on this layer would immediately assume the new appearance.

Another example of the power of layer-based appearance settings is related to blocks. Assume that you have a tree symbol that includes a gradient fill. In AutoCAD, if you need to change the fill of this tree symbol, you would need to explode the block, replace its fill object, and redefine the block. In M-Color, you can change the appearance of blocks without redefining them because the fill styles and outline styles you assign to layers affect block parts as well.

### 4.2 Fill Styles and Outline Styles

Plain AutoCAD has an unfortunate limitation in controlling the plotting appearance of an object. The outline and the fill in AutoCAD are separate objects. For example, the outline is a polyline object, and the fill is a solid hatching object. To change the color of the outline, you modify the polyline object. To change the color of the fill, you modify the solid hatching object.

M-Color uses the concepts of *fill styles* and *outline styles*. A single object, such as a polyline, can have both a fill style and an outline style. The fill style might define that the polyline should be filled with a gradient fill, and the outline style and width settings would define that the outline of

the polyline should be a 1.0 mm black line. There is no need to maintain duplicate geometry for fills and outlines like in plain AutoCAD.

M-Color lets you use any of the available style types for either fill, outline, or both. The style types offered by M-Color include solid color styles, translucent styles, gradient styles and bitmap texture styles.

### **4.3 Controlling the Plotting Order of Objects**

In AutoCAD, controlling the plotting order (drawing order) of objects can be a real pain. The plotting order is controlled on an object-by-object basis, making the process very tedious and prone to errors. For example, you have to make sure that you have not forgotten any text object behind solid color fills, otherwise they will not be visible in the final plot.

M-Color makes controlling the plotting order of objects very simple. Instead of controlling individual objects, you control the plotting order of layers. Just drag layers up and down in a list to change their relative plotting order.

This method of controlling the plotting order in M-Color ensures that the plotting order of objects remains stable also when you add new objects to the drawing or move existing objects. The new or modified objects simply assume the plotting position of their layer. For example, you can define that text labels are always printed on top of color-filled areas.

### **4.4 Reusing Plot Appearance Configurations in New Drawings**

Professional CAD work typically includes producing similar drawings repeatedly. For example, you may produce a site layout plan of each new project. The plot appearance requirements of all your site plans are essentially the same. The layer structure of these drawings is also similar.

M-Color let you take advantage of this and reuse plot appearance configurations in new drawings. M-Color saves the plot appearance settings of a drawing in an external file (a CFG file). The CFG file defines the fill styles, outline widths and outline styles of CFG layers. If the layer structure of a new drawing is similar to some previous drawing, you can use the CFG file of that drawing to quickly apply the same appearance settings to the new drawing.

In plain AutoCAD, you typically need to color-fill all new drawings separately by using solid hatching to add fills to individual objects. M-Color's way of defining plot appearance settings by layers and reusing plot appearance configurations results in significant time savings in preparing similar drawings in new projects.

### **4.5 Modifying the Drawing**

Many AutoCAD users use a graphics software package such as PhotoShop and import their AutoCAD drawing into that application to enhance the appearance of the plots. One shortcoming of such an approach is the need to modify the original AutoCAD design. Few projects are final at the time they are first plotted. Instead, several rounds of modifications are needed. After each modification in AutoCAD, the drawing must be imported into PhotoShop again, and the graphical effects need to be reapplied.

M-Color eliminates this frustrating process of editing and re-coloring completely. M-Color always uses the latest geometry from the AutoCAD drawing, and applies the plot appearance settings to that geometry. Adding, deleting or moving objects in the AutoCAD drawing do not require any additional steps on the M-Color side. Because the plot appearance settings are layer-based, M-Color already knows how to show the new or modified objects.

### **4.6 Advanced Previewing Capabilities**

M-Color offers much more advanced previewing capabilities than plain AutoCAD. M-Color Preview lets you view the final plot on screen just as it will appear when plotted on paper. You can zoom and pan the drawing to verify that the appearance of all details is correct. You can even edit



the appearance settings while previewing the drawing. When you assign new fill styles or outline styles to the layers or change the plotting order of layers, you can immediately see the effect on the plot being previewed.

## 5. Performance

Large-format, complex drawings may take some time to plot. The plotting software has an important role in keeping plotting times of drawings reasonable. If the addition of graphical effects makes plotting take hours instead of minutes, the graphical effects are not really usable in real-world projects.

M-Color takes extensive measures to ensure that plotting is as fast as possible and produces as small plot files as possible with all output technologies. In many cases, this leads to dramatic differences in printing time and plot file size between standard AutoCAD and M-Color plotting.

### Gradient Fills

AutoCAD 2004 introduces a new hatching type, a gradient fill. However, the plotting performance of AutoCAD's gradient fills is not very good. Apparently, AutoCAD uses the basic gradient filling support of Windows (GDI+) and treats the gradient fills essentially as bitmaps. This is OK for small plots but leads to large plot files in large-format plotting.

Unlike AutoCAD, M-Color optimizes the printing of gradient fills separately for each output technology. As a result, printing gradient fills from M-Color is faster and the plot files are smaller. In practice, this may mean that only M-Color can let you use as many gradient fills in your drawings as you want.

*Example:* Example: A single, large, gradient filled polyline on an ISO A1 -size paper.

#### Printing to file on HP DesignJet 1055CM:

- AutoCAD 2006: Printing time **285 seconds**, plot file size **183 megabytes**.
- M-Color 9: Printing time **3 seconds**, plot file size **66 kilobytes**.

#### Printing to file on a PostScript plotter (HP DesignJet 500PS 42 by HP):

- AutoCAD 2006: Printing time **477 seconds**, plot file size **4,5 megabytes**.
- M-Color 9: Printing time **29 seconds**, plot file size **136 kilobytes**.

Producing a PS level 3 file with M-Color PS generator took 10 seconds, plot file size 5KB.

### 5.1 Publishing to PDF, PS and Bitmap File Formats

As described previously, M-Color has high-performance support for publishing presentation plots to multiple target formats, including PDF, PostScript and all common bitmap file formats. An essential part of this publishing functionality is performance. M-Color processes even the most complex drawings in relatively short time, does not consume too much memory, and produces a compact target file.

For example, producing a PDF file of the gradient fill sample drawing mentioned in the previous example took less than one second in M-Color and resulted in a compact, three-kilobyte PDF file.