

Screening - The science behind printing images.

The conventional method of producing continuous-tone images with ink on a printing press is known as the halftone screen. Known by many, more simply as 'screening', this is the method used to create and print shades on the press by using a single colour ink.

Screening works by varying the size or density of dots, so the eye can see a shade somewhere between the solid colour and the colour of the background paper

Traditional (AM) Screening

Traditional halftone screens use spots which are placed on a fixed grid, with centres equidistant apart. Larger spots render darker tonal values, or more saturated areas of colour, while smaller spots make up lighter tonal values. When printing a full colour image, four inks are used (CMYK), the CMYK inks are laid down at specific screen angles. This creates the appearance of a continuous range of colours beyond the four inks actually printed on the paper. Because the size, or amplitude, of the spots varies, traditional halftone screening is also sometimes called AM screening.

FM / Stochastic screening.

With digital technology advancing and dots becoming smaller, the viability of alternative screening methods is increasing. Added to that, almost all proofs handed to a printer these days by customers are printed on home or small office printers that use a form of FM screening.

FM screening, also known as Stochastic screening, is different from traditional Halftone (AM) screening, in that instead of using constantly varying dot sizes arranged in a fixed cell structure, FM screens use dots of uniform size which vary in density. Dots which are widely distributed create lighter tonal values, while dots clustered together form darker tonal values.

All FM screening methods tend to use noise and interference along with stochastic algorithms that control dot placement. In simple FM screening, the algorithm simply adjusts the positioning of the uniform dots, clustering them for darker tonal values. In these types of screens, the clusters can increase dot gain and lead to graininess in flat-tint areas. More advanced screening applies a second algorithm that is applied to the mid tone areas, and as a result, changes the cluster of dots into more orderly patterns in the midtones and then modifies the size or shape of dots to control noise and plugging. Many of the larger CTP supplies now offer forms of FM screening. Creo, Agfa ect...

Advantages of FM / Stochastic Screening

One of the biggest advantages of FM screening is that it eliminates moiré patterns that can form in halftones. With AM screens, the registration and FIT on press is critical. When a good registration is achieved, the colours form a balanced, usually inoffensive, rosette pattern; but misregistration, image content or conflicting screen angles can cause disturbing and off-putting moiré patterns.

Not only does FM screening eliminate moiré patterns, but it offers production benefits as well. In particular, FM screening affords the option of scanning at lower resolutions—and creating smaller, easier-to-manage digital files—while still producing the detail that rivals what can be achieved with high-frequency screen rulings. And, because the lack of screen angles makes FM screening more tolerant of misregistration, presses can be run at higher speeds if necessary, such as for rush jobs.