

TRAPPING: SPREADING AND CHOKING

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Spreading and choking is a prepress technique, more often referred to as trapping. It consists of creating small overlaps between abutting colors in order to mask registration problems on the printing press later on in the graphical production.

Why trap?

Misregistration in the graphical workflow may be caused by a number of reasons:

- inaccuracies in the image setter
- instability of the image carrier like stretch in film or plate
- inaccuracy in the film to plate or film to film copying steps
- instability of the press
- instability of the final media
- human error

These inaccuracies are inherent to the graphical production process and can be minimized by working with the best tools and materials only; still they will never disappear. Any mechanical process will always show some margin of error. The small gaps showing up as a result can however be hidden by creating overlaps in between two adjacent colors.

Trapping methods

One approach to trapping is to change the submitted artwork. In general, all digital files produced using any current professional software have some level of trapping provided already, via application default values. Additional trapping may also be necessary, but all traps should be as unobtrusive as possible.

Traps can be applied at several stages in the digital workflow, using one of two trapping technologies: vector-based and raster-based. The right choice will depend on the type of products (packaging applications including flexo-printing have other requirements than commercial printing on offset systems) and the degree of interactivity or automation that is wanted.

In-RIP trapping moves the trapping to the RIP so that it is done at the last moment. The process is automatic, though it is possible to set up zones to allow different automatic rules for different areas, or to disable trapping for areas previously manually trapped.

Trapping decision making

Certain basic rules have to be observed.

First the decision should be made if a trap is needed between two specific inks, in other words, if these two abutting colors are printed is there a risk of gaps showing up when misregistration happens.

In case the two colors in question are spot colors, trapping is always needed: from the moment the artwork is imaged on film or plate, they are handled separately and ultimately will be printed on two different printing units. The same applies if one of the colors is a spot, the other a process color.

The decision becomes a bit more tricky if the two colors are process colors and will each be printed as a combination of the basic printing colors Cyan, Magenta, Yellow and Black. In this case the decision whether to trap or not will be defined by the amount of 'common' color.

Another factor that will influence the visibility of the traps is the direction of the trap. The decision which color should be spread or choked is usually decided upon the relative luminance of the colors in question. The 'lighter' color should always be spread into the darker. Again this reflects the way the human eye perceives color: since the darker colors define the shapes we see, distortion of the lighter color will result in less visible distortion overall. The 'lightness' or 'darkness' of a color is usually defined as its 'neutral density'.

A major exception to this rule should be applied when opaque spot colors are used. Other colors, regardless of the relative luminance should always be trapped to (spread under) these spot colors. If several of these spot colors are used (a common practice in the packaging market), it is not the luminance of the color but the order of printing that will be the decisive element: the first color to be printed should always spread under the next color.

The thinner the traps created, the less visible they will be. Therefore the trap width should be set to the strict minimum, dictated by the maximum amount of misregistration or error margin of the whole production workflow up to the printing press. Since the printing technology and the quality of the paper are the most important causes for misregistration it is possible to come up with some rules of thumb. E.g. for quality offset printing it is generally accepted that the trapping width should be between 1 and 1/2 print dots. When printing at 150 lpi the traps should be between 1/150 and 1/300 inch. (0.48 pt. and 0.24 pt., 0.16 mm. and 0.08 mm.). These values are usually multiplied with a factor of 1.5 or 2 whenever one of the colors is Black. First of all the trap will not be visible since the lighter color will be spread underneath the -almost- opaque black. For the same reason, in many cases, black ink will be set to "overprint" colors in the background, eliminating the more complex process of "spreading or choking". Since black is a very dark color, white gaps caused by misregistration will be the more visible. On top of that -in wet-in-wet offset printing- black is the first color to be laid down on paper, causing relatively more distortion of the paper and thus at higher risk of showing misregistration.

Whenever a trap between two colors is created this trap will contain the sum of the two colors in question whenever at least one of them is a spot color. In case the two colors are process colors, the trap will contain the highest value of each of the CMYK-components. This trap color is always darker than the darkest of the two abutting colors. In some cases, more specifically when the two colors are light pastel-like colors, this might result in a trap that is perceived as too visible. In this case it might be desirable to reduce the amount of color in the trap. This should however be limited: the trap should never be lighter than the darkest color since this would have the same effect as misregistration: a light colored 'gap' between the two colors. Trap color reduction is also not recommended when solid spot colors are used. In this case reduction would cause the spot color in the trap to be printed not as a solid but as a screened tint.

Trapping towards a rich black (a black with a support screen of another color added to it to give it a 'deeper' look and making it more opaque - often called "undercolor"), will follow the same rules as trapping to a 'normal' black. However, a stay-away should be created for the supporting color. This will prevent misregistration from revealing the undercolor at the edges of the rich black object. In short, a stay-away pushes the undercolor away from the edge of the rich black, and is usually created with a single color black stroke, set to "knock-out".

Blends or 'vignettes' often offer special challenges to trapping. The lighter part of a blend needs to spread into the background, the darker part needs to be choked. If a trap over the full length of the blend is needed, this would result in a very visible 'staircase'. The solution here is the creation of a sliding trap: a trap that should not only gradually change color but also position. The trap can be created so that it 'slides' all the way, but this not often the desired effect either since it might distort the original artwork too much. Often the 'sliding' factor is set to a point where the neutral densities of blend and background reach a certain difference.