POSTSCRIPT HALFTONE SCREENING

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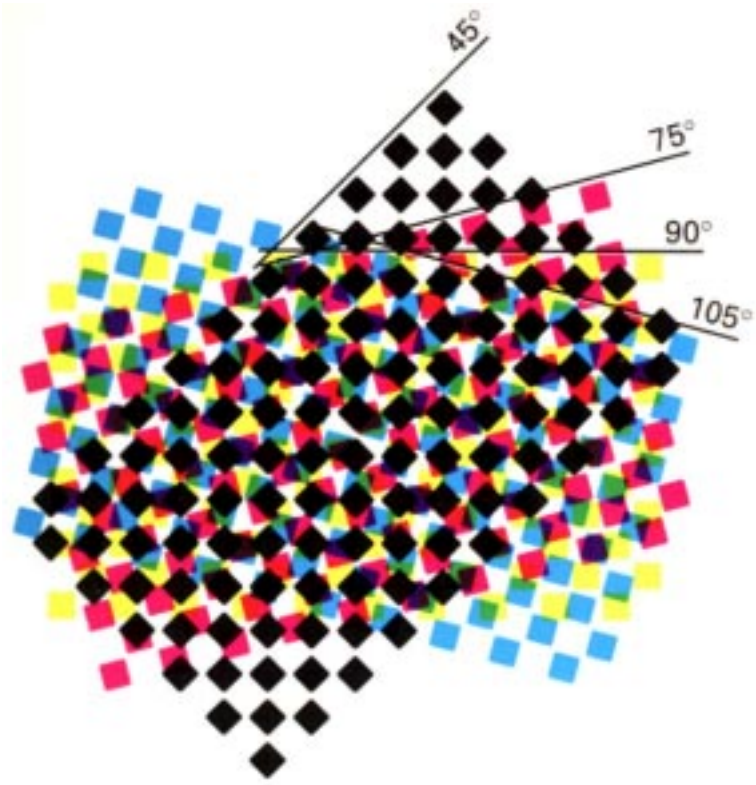
The first postscript screens were developed for black and white printing. With colour printing, no matter how flawless each screen is by itself, it is how the 4 screens interact that makes the difference.

Setting the halftone screens at the traditional angles of 0º, 15º, 45º and 75º minimises the moire patterns. The postscript generated digital halftone screens at these angles present problems.

At some angles such as 0º and 45º, the corners of each halftone cell intersects the recorder grid at the 'corners' of spots. Each halftone cell is then identically shaped and consists of the same number of spots. Angles such as these are called RATIONAL TANGENT ANGLES because their tangent can be expressed as a ration between two integers (horizontal and vertical spots). All the halftone cells are identical and a single halftone cell can be calculated - which spots to draw for a 10% dot or a 20% dot. During the screening the RIP can be instructed to call this one halftone cell and duplicate it along the angle of the screen. This technique vastly reduces the number of calculations required for screening and increases performance of RIP and imagesetter.

Traditional Screen Angles



At other angles such as the traditional screen angles of 15º and 75º the corners of each halftone cell do not intersect the recorder grid in any consistent way. As a result, the halftone cells are not identically shaped and do not contain the same number of spots. Angles such as these are called IRRATIONAL TANGENT ANGLES because their tangent cannot be expressed as a ratio between two integers (horizontal and vertical spots). This technique requires an enormous number of calculations and hence considerable computing power. This is the process used in many high-end, proprietary scanner-recorder systems.

The alternative is to round the irrational tangent angle up or down to the nearest rational tangent angle. Then all halftone cells are identical and need be calculated only once. This technique, in which only rational tangent angles are used, is called RATIONAL TANGENT SCREENING.

Traditional Screens

	Angle	*Lines Per Inch*
Cyan	15º	133
Magenta	75º	133
Yellow	0º	133
Black	45º	133

Rational Tangent Screens

	Angle	*Lines Per Inch*
Cyan	15.0037º	138.142
Magenta	74.9963º	138.142
Yellow	0º	138.545
Black	45º	138.158

The rational tangent screen angles indicated are used by Agfa and Linotype-Hell.

QUESTIONS ON POSTSCRIPT HALFTONE SCREENING

(1) State the halftone screen angles for CMYK?

(2) What happens if these angles are not used?

(3) Postscript halftone screens need to have the angles adjusted, what are they for CMYK?