The screen angle and ruling recommendations for color separation in this document apply to the **Linotronic* 230 imagesetter and the Linotronic 630 imagesetter**. Recommendations for the Linotronic 300, 330, 500 and 530 imagesetters are included in a Linotype-Hell technical information piece called Angle and Ruling Recommendations (part number 3072).

For background information on topics related to halftoning, please refer to earlier technical information pieces on *Resolution and Screen Ruling*, part number 3051, *Measuring Screen Angle and Ruling*, part number 3055, *Digital Halftone Dots*, part number 3060, and *Moiré*, part number 3064.

RT and HQS Screening

For users of Linotronic imagesetters and RIPs, there are two types of halftoning: RT Screening* and HQS Screening*. Both of these methods (which were developed by Linotype-Hell) have been used in high-end scanners, but HQS Screening has only recently been made available to users of the PostScript** page description language.

RT Screening is the screening algorithm that has been used by the PostScript page description language since 1985 (and recently licensed to Adobe** Systems by Linotype-Hell). RT Screening is particularly suitable for black and white reproduction, but may also be used for color separation. When RT Screening is used for color separation, recommendations for screen angle and ruling should be used to minimize moiré.

HQS Screening is the Linotype-Hell screening algorithm that is available for use with the RIP 30 and RIP 40[1]. HQS Screening is particularly appropriate for color separation because of its ability to achieve screen angle and ruling more accurately than RT Screening. This allows higher quality color separations. HQS Screening works best when recommendations for screen angle and ruling are followed.

[1]HQS Screening works on both RIP 30's and RIP 40's with PostScript version 52.3 and above.

Recommendations

Imagesetter resolution plays an important role in the screen angles and rulings that can be achieved by any halftoning method. Because of this, some screen angles and rulings are more appropriate for certain resolutions than for others. Based on research done in Linotype-Hell's R&D facility, lists of recommendations have been developed for both RT Screening and HQS Screening. These lists, divided by resolution settings, are shown on the following pages.

More information

For more information on the ability of the Linotype Utility* to turn RT Screening and HQS Screening on and off please refer to the Linotype-Hell technical information piece called Angle and Ruling Recommendations (part number 3072). This article also covers the filters within the RIP 30 and RIP 40 that are used to select the appropriate screen angles and rulings, as well as a method for turning off the filters when desired.

Linotronic 230 Recommendations

HQS Screening   1693 RESOLUTION

	Color	Ruling	Angle	Grays	Imagesetter
133 lines per inch	Cyan	133.042 lpi	14.9996°	164	**230**
	Magenta	133.042 lpi	75.0004°		
	Yellow	133.684 lpi	0.0°		
	Black	133.041 lpi	45.0°		
120 lines per inch	Cyan	119.769 lpi	14.9911°	201	**230**
	Magenta	119.769 lpi	75.0089°		
	Yellow	120.952 lpi	0.0°		
	Black	119.737 lpi	45.0°		
100 lines per inch	Cyan	99.777 lpi	15.0013°	256	**230**
	Magenta	99.777 lpi	74.9987°		
	Yellow	99.608 lpi	0.0°		
	Black	99.781 lpi	45.0°		

HQS Screening   1270 RESOLUTION

	Color	Ruling	Angle	Grays	Imagesetter
100 lines per inch	Cyan	99.782 lpi	14.9996°	156	**230**
	Magenta	99.782 lpi	75.0004°		
	Yellow	100.261 lpi	0.0°		
	Black	99.781 lpi	45.0°		
90 lines per inch	Cyan	89.827 lpi	14.9911°	205	**230**
	Magenta	89.827 lpi	75.0089°		
	Yellow	90.714 lpi	0.0°		
	Black	89.803 lpi	45.0°		

HQS Screening   846 RESOLUTION

	Color	Ruling	Angle	Grays	Imagesetter
85 lines per inch	Cyan	85.523 lpi	15.0013°	102	**230**
	Magenta	85.523 lpi	74.9987°		
	Yellow	84.667 lpi	0.0°		
	Black	85.526 lpi	45.0°		

RT Screening   1693 RESOLUTION

	Color	Ruling	Angle	Grays	Imagesetter
133 lines per inch	Cyan	133.843 lpi	18.435°	164	**230**
	Magenta	133.843 lpi	71.565°		
	Yellow	130.256 lpi	0.0°		
	Black	119.713 lpi	45.0°		
107 lines per inch	Cyan	107.096 lpi	18.435°	251	**230**
	Magenta	107.096 lpi	71.565°		
	Yellow	112.889 lpi	0.0°		
	Black	119.737 lpi	45.0°		

RT Screening   1270 RESOLUTION

	Color	Ruling	Angle	Grays	Imagesetter
100 lines per inch	Cyan	100.4023 lpi	18.435°	156	**230**
	Magenta	100.4023 lpi	71.565°		
	Yellow	105.8333 lpi	0.0°		
	Black	112.2530 lpi	45.0°		

RT Screening   846 RESOLUTION

	Color	Ruling	Angle	Grays	Imagesetter
90 lines per inch	Cyan	89.246 lpi	18.435°	91	**230**
	Magenta	89.246 lpi	71.565°		
	Yellow	94.074 lpi	0.0°		
	Black	99.781 lpi	45.0°		

Linotronic 630 recommendations

HQS Screening — 3251 Resolution

Lines per inch	Color	Ruling	Angle	Grays	Imagesetter
200 lines per inch	Cyan	200.619 lpi	15.1151°	256	**630**
	Magenta	200.619 lpi	74.8849°		
	Yellow	191.247 lpi	0.0°		
	Black	199.908 lpi	45.0°		
190 lines per inch	Cyan	190.911 lpi	14.8863°	256	**630**
	Magenta	190.911 lpi	75.1137°		
	Yellow	180.622 lpi	0.0°		
	Black	191.579 lpi	45.0°		
165 lines per inch	Cyan	165.139 lpi	15.1879°	256	**630**
	Magenta	165.139 lpi	74.8121°		
	Yellow	154.819 lpi	0.0°		
	Black	164.210 lpi	45.0°		
150 lines per inch	Cyan	148.847 lpi	15.1151°	256	**630**
	Magenta	148.847 lpi	74.8849°		
	Yellow	141.357 lpi	0.0°		
	Black	148.319 lpi	45.0°		
133 lines per inch	Cyan	135.464 lpi	15.0581°	256	**630**
	Magenta	135.464 lpi	74.9419°		
	Yellow	127.498 lpi	0.0°		
	Black	135.232 lpi	45.0°		

HQS Screening — 2438 Resolution

Lines per inch	Color	Ruling	Angle	Grays	Imagesetter
150 lines per inch	Cyan	149.655 lpi	14.9379°	256	**630**
	Magenta	149.655 lpi	75.0621°		
	Yellow	143.435 lpi	0.0°		
	Black	149.931 lpi	45.0°		
120 lines per inch	Cyan	123.153 lpi	15.0013°	256	**630**
	Magenta	123.153 lpi	74.9987°		
	Yellow	116.114 lpi	0.0°		
	Black	123.158 lpi	45.0°		
100 lines per inch	Cyan	101.425 lpi	14.9996°	256	**630**
	Magenta	101.425 lpi	75.0004°		
	Yellow	97.536 lpi	0.0°		
	Black	101.424 lpi	45.0°		

HQS Screening — 1219 Resolution

Lines per inch	Color	Ruling	Angle	Grays	Imagesetter
75 lines per inch	Cyan	74.8275 lpi	14.9379°	256	**630**
	Magenta	74.8275 lpi	75.0621°		
	Yellow	71.7176 lpi	0.0°		
	Black	74.9656 lpi	45.0°		

Notes:
- Gray values are listed on the charts because of their importance in quality output. The number of gray values is dependent on screen ruling and imagesetter resolution. PostScript allows a maximum of 256 grays per separation.
- HQS Screening values alone will not produce acceptable results. HQS Screening must be active on the target RIP.

Linotronic 630 recommendations (continued)

RT SCREENING   3251 RESOLUTION

	Color	Ruling	Angle	Grays	Imagesetter
162 lines per inch	Cyan	171.353 lpi	18.435°	256	**630**
	Magenta	171.353 lpi	71.565°		
	Yellow	162.560 lpi	0.0°		
	Black	153.263 lpi	45.0°		

RT SCREENING   2438 RESOLUTION

	Color	Ruling	Angle	Grays	Imagesetter
121 lines per inch	Cyan	128.515 lpi	18.435°	256	**630**
	Magenta	128.515 lpi	71.565°		
	Yellow	121.920 lpi	0.0°		
	Black	114.947 lpi	45.0°		
60 lines per inch	Cyan	64.2575 lpi	18.435°	256	**630**
	Magenta	64.2575 lpi	71.565°		
	Yellow	60.9600 lpi	0.0°		
	Black	57.4736 lpi	45.0°		

RT SCREENING   1219 RESOLUTION

	Color	Ruling	Angle	Grays	Imagesetter
60 lines per inch	Cyan	64.2575 lpi	18.435°	256	**630**
	Magenta	64.2575 lpi	71.565°		
	Yellow	60.9600 lpi	0.0°		
	Black	57.4736 lpi	45.0°		

Research and development

Additional values for screen angle and ruling are constantly being developed by Linotype-Hell's research and development facility. The values in this document reflect the state of this research as of the fall of 1991.

Comments

Please direct any questions or comments to:

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