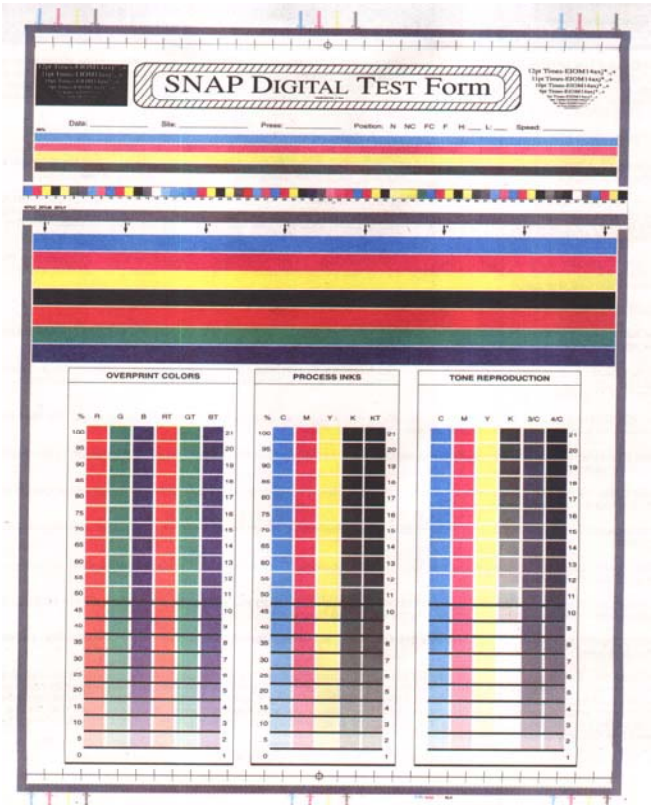
US Ink® A Division of Sun Chemical Corporation

Print Quality Assessment



Copyright US Ink

Volume IV

Print Quality Assessment
Newsprint

Solid Ink Density

Density is the ability of a material to absorb light. Generally, the darker a process color is to the eye, the higher the density. Density measurements of solid ink patches are used to monitor the ink film thickness applied during a press run. In comparing two printed sheets, density readings should be within .05 units when measured on a densitometer, for meaningful print quality assessment. Dot gain, print contrast and apparent trap are directly affected by this solid ink density. Generally, these values will vary as the solid ink density changes. Therefore, monitoring solid ink density during a press run is essential when comparing any printed material in terms of quality. There are various publications that list target densities for printing on newsprint stocks. Listed below is a survey of these density recommendations. See Appendix for publication reference.

	Black	Cyan	Magenta	Yellow
NAA VOL. 8 Target Density	**1.05**	**.90-.95**	**.90-.95**	**.85-.90**
X-Rite Target Density	**1.00-1.10**	**.85-.95**	**.85-.95**	**.80-.90**
SNAP Target Density	**1.00-1.10**	**.85-.95**	**.85-.95**	**.80-.90**

Note- The values reported by SNAP are for dry ink films while the values for the X-Rite and NAA targets are for wet ink films.

Dot Gain

Dot gain can be described as the growth in size of a halftone dot through the successive stages of the printing process. The value measured in this assessment is "total dot gain" which includes both mechanical and optical dot gain. It is a measure of the total dot growth when producing negatives, plates and the printed sheet. Dot gain values are typically reported from the midtone portion of the printed material (50%). This measurement is a direct increase in the percent dot area. Therefore, a 50% film dot that produces an 85% printed dot, has a 35% total dot gain. All dot gain values in the following assessment were calculated by the Murray/Davies formula. As mentioned earlier, print density can directly affect dot gain. Generally, when density increases, an increase in the amount of dot gain will occur. Listed below are typical dot gain ranges for printing on newsprint.

	Black	Cyan	Magenta	Yellow
GATF	**25-35%**	**25-35%**	**25-35%**	**25-35%**
SNAP	**28-34%**	**28-34%**	**28-34%**	**28-34%**
X-Rite Corp.	**34%**	**33%**	**30%**	**28%**

Note- All reported values are calculated from the midtone (50%) area.

Print Contrast

Print contrast measures how well shadow detail is maintained on a printed sheet. It is a ratio of the 75% screen dot density to solid density and calculated as follows:

$$\% PC = \frac{D_S - D_{75}}{D_S} \times 100$$

D_S = density of solid
D_{75} = density of 75% screen

Print contrast should only be used as a comparison of one print to another. In general, a print with a higher print contrast will produce an image with greater shadow detail. Typical print contrast numbers for printing on newsprint follow.

	Black	Cyan	Magenta	Yellow
GATF	7-20	7-20	7-20	7-20
SNAP	12.7	12.0	14.5	15.7
X-Rite Corp.	24	22	22	18

Hue Error/Grayness

"Hue error," is an expression that indicates how far a process color is from its theoretical ideal. Grayness is an indication of how "clean" a process color is, again compared to its theoretical ideal. Some typical hue error/grayness values for process colors printed on newsprint follow.

Hue Error/Grayness

	Cyan	Magenta	Yellow
X-Rite Corp.	**28/42**	**58/34**	**10/25**
SNAP	**28/10**	**56/11**	**7.5/1.4**

Note- The X-Rite Corp. values for hue error/grayness are calculated with the newsprint included. The SNAP values do not include the effect from the paper.

Apparent Trap

Apparent trap indicates how well a printed ink film accepts an ink overprinted on it. Changes in these values throughout a press run can indicate changes in the hue of secondary colors that are critical to good color reproduction. All apparent trap values in the following assessment were calculated using the Preucil Equation. These values are directly affected by solid ink density, ink/water balance, paper and press conditions. Typical trap values for overprints on newsprint follow:

	Green	Blue	Red
GATF	**80-90%**	**70-79%**	**40-59%**
SNAP	**81%**	**69%**	**49%**
X-RITE Corp.	**65%**	**60%**	**55%**

Note - The reported trap values are only valid for the CMY color sequence. Black can be printed first or last.

APPENDIX

A Guide to Understanding Graphic Arts Densitometry., The X-Rite Corporation, 3100 44th Street, Grandville, Michigan 49418.
(616) 534-0723

GATF Newspaper Test Form Kit Users Guide., GATF, 200 Deer Run Road, Sewickley, Pennsylvania, 15143-2600 (412) 741-6860 (800) 910-4283

ROP Newspaper Color Ink Book (Volume 8)., Newspaper Association of America, The Newspaper Center, 1921 Gallows Road, Suite 600, Vienna, VA 22182-3900
(703) 519-8142

(SNAP) Specifications for Non-Heat Advertising Printing., Non-Heatset Web Section, 100 Daingerfield Road, Alexandria, Virginia 22314 (703) 519-8142