

RESEARCHING THE POSSIBILITY OF USING OFFSET UNCOATED PAPERS IN INDIRECT ELECTROPHOTOGRAPHY PRINTING

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Abstract

The article refers to the electrophotography printing issues. The main purpose was research on the quality evaluation and comparison of prints printed on HP Indigo electrophotography printing machine. Prints were made on different papers: suitable for digital and for offset technique.

It was shown that offset papers can be used in indirect electrophotography excluding multicolour pictures printing because of mottling risk and problems with colour reproduction. In the article there were presented parameters of these papers.

Key words: *digital printing, indirect electrophotography, suitable papers, offset papers, gamut, optical density*

Methodology

Papers suitable for ink-jet and papers usually applied in offset printing technique were printed using indirect electrophotography printing machine – with electroink. Before the production, Indigo was calibrated: transformation related to the linearization and the ink limit was carried out (*Color Management disabled*).

Papers were printed by ANSI IT8/7.3 color chart with 928 control patches. The spectral reflectance of all patches was measured using SpectroScan (Gretag Macbeth) and colorimetric properties: illuminant D50 and standard color observer, angle 2°. There was also densitometer utilized.

There were used white suitable for digital printing uncoated papers in two grammages: 90 and 300 gsm. There were also printed 2 types of offset papers (suitable for offset technique):

- bulky uncoated cream – 70 and 300 gsm
- uncoated white – 70 and 400 gsm [1,2]

Results

The studies included tone value increase, trapping, optical density and gamut of prints.

Tone value increase

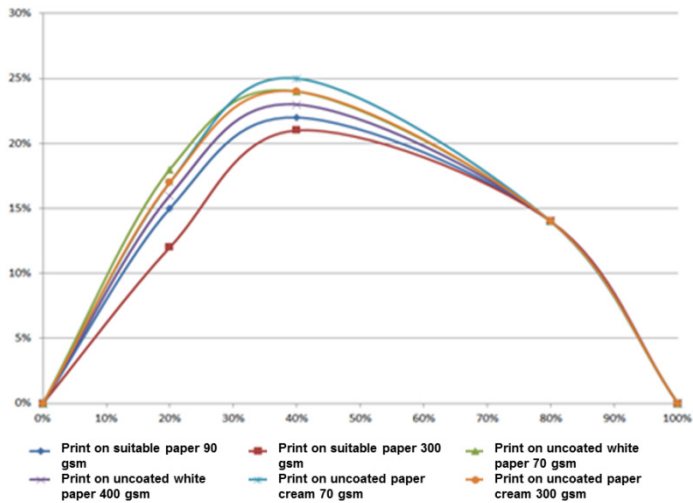


Figure 1: Tone value increase of uncoated papers used in research

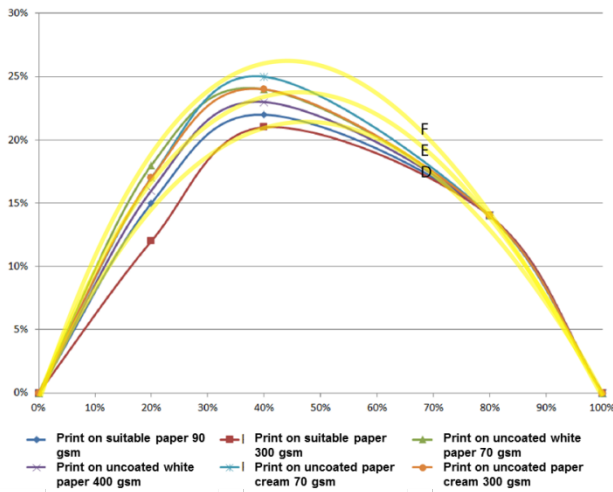


Figure 2: Tone value increase of uncoated papers compared with prints' categories F, E, D mentioned in ISO 12647-2

The smallest increases characterized prints made on suitable papers, however uncoated white papers' increases weren't much bigger. The biggest increase were characteristic for prints on cream bulky papers.

There was also made a comparison with ISO standard (Figure 2) with categories of prints (see Table 1). Prints from research were most similar to F,E,D categories.

Table 1: Categories of prints connected with tone value increase (3)

Film	Tone value increase on print							
	A	B	C	D	E	F	G	H
25	9	12	15	18	20	23	26	29
40	13	16	19	22	25	28	31	34
50	15	17	20	23	25	28	31	33
70	14	16	17	18	20	21	23	24
75	13	14	15	16	17	18	19	20
80	12	12	13	14	14	15	16	17

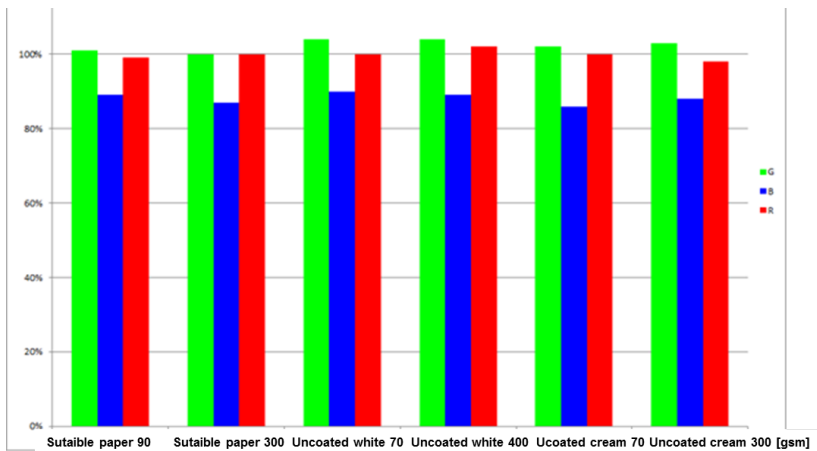


Figure 3: Trapping of prints made on different uncoated papers

The biggest trapping characterized prints made on uncoated offset papers, especially for green colour. For green trapping exceeded 100%. It means that in process of making colour took part more than 2 inks.

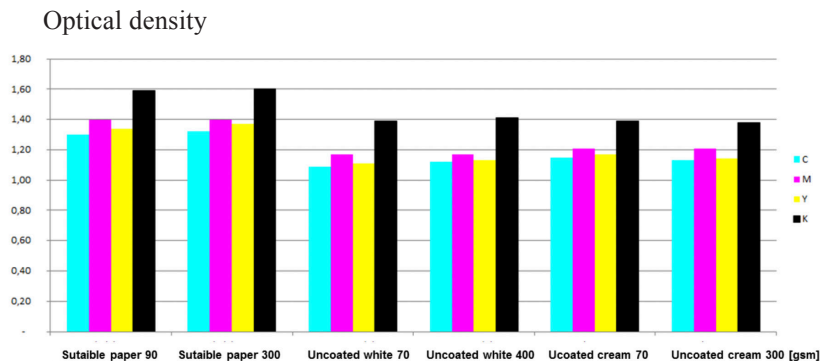


Figure 4: Optical density of prints made on uncoated papers

The biggest densities characterized prints made on suitable papers. However, all densities were bigger than the ones recommended by Micheal Huber and Heidelberg companies (see Table 2).

Table 2: Optical density recommended by Micheal Huber and Heidelberg [4,5]

Type of paper	C	M	Y	K
Uncoated, white	0,90	0,80	0,80	1,00

Gamut

The widest gamut is characteristic for prints made on suitable papers. However, prints on white offset paper was characterized by similar gamut. On the one hand, the lowest one characterized prints on bulky cream papers. On the other hand, the differences between all prints were very small.

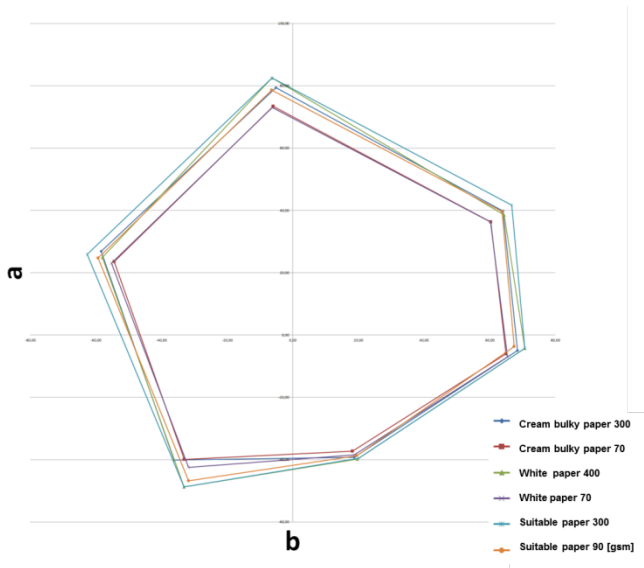


Figure 5: Gamut of prints made on uncoated papers

Conclusion

To sum up, offset papers can be used in indirect electrophotography excluding multicolour pictures printing because of mottling risk and problems with colour reproduction. According to the results of research and to the references, the parameters of those papers are:

- uncoated wood-free paper
- grammage – 170 to 250 gsm
- roughness $PPS_{10} - 4,0 \pm 0,5 \mu\text{m}$
- water absorption $Cobb_{60} - 38 \pm 3 \text{ gsm}$ [1]

Reference

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3. ISO 12647-2 standard
4. www.mhp.com.pl [viewed on March 2019]
5. www.heidelberg.com [viewed on March 2019]