

Influence of Ink Viscosity level on Tone Value Increase in Sheet-fed Offset Printing

Dr. Ahmed Ahmed Elwan

Lecturer, Faculty of Applied Arts, Helwan University, Cairo, Egypt

Abstract:

Purpose - Dot gain is caused by ink spreading around halftone dots. Several factors can contribute to the increase in halftone dot area. As printing pressure can squeeze the ink out of its dot shape causing gain, ink viscosity is a contributing factor with coated papers, higher viscosity inks can resist the pressure better than lowest viscosity ink. Halftone dots can also be surrounded by a small circumference of ink. Each halftone dot has a microscopic relief, and ink will fall off the edge before being eliminated entirely by the fountain solution in the case of sheet-fed offset printing. The lithographic inks behavior necessitates viscosity measurement over the full range of shear rates that inks can encounter in use, this range is very wide since very low shear rates are encountered in removing ink from the can and in the ink duct, whereas exceedingly high rates of shear exist in the roller nips of fast running presses. **The aim of this research** is to determine the influence of the different ink viscosity levels on tone value increase of final prints in sheet-fed offset printing. **Design/Methodology/Approach** - Three different ink viscosity levels were used with each inking system on each printing unit, to examine tone value increase (dot gain) for sheet-fed offset printing process, measured on matte-coated paper prints. The analysis of tone values results in order to determine their dependency on ink viscosity level and which viscosity level generates the best print reproduction for the tone values. **Findings** - Applied ink viscosity levels influenced tone value, as well as that there was no clear trends of how print quality degrades or improve with the same ink viscosity change for tone value. Obtained mechanical dot gain values on the plates show that all tone values are reproduced correctly, without bigger increases. Taking into account ISO 12647-2:2004 standard, and reference TVI values for the prints, the most appropriate TVI values were achieved by using different ink viscosity levels for different inks, low ink viscosity level produced the best TVI values for magenta ink, normal ink viscosity level showed as a best option for cyan and yellow inks, while high ink viscosity level generated the best results for black ink.

Keywords:

*Sheet-fed Offset Printing,
Ink viscosity,
Tone value increase,
Dot gain,
Ink density*

Paper received 4th February 2017, Accepted 16th March 2017, Published 1st of April 2017