Developments in the Deinkability of HP Inkjet Inks

Gregg Lane, Minedys Macías and Nils Miller

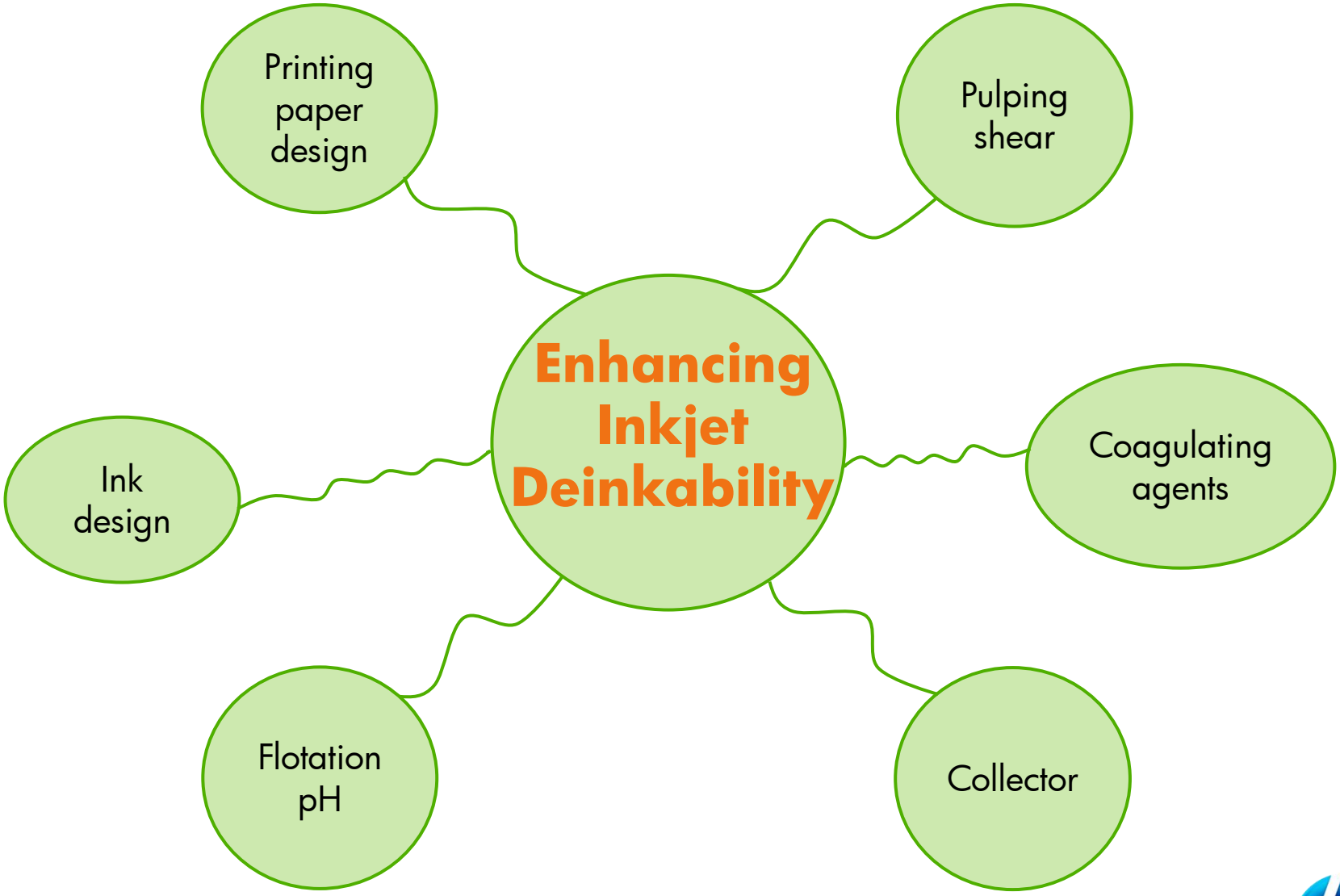
Hewlett-Packard Co., San Diego

With results from Elisabeth Hanecker - *PTS, Munich*

HIT PRINT RESPONSIBLY

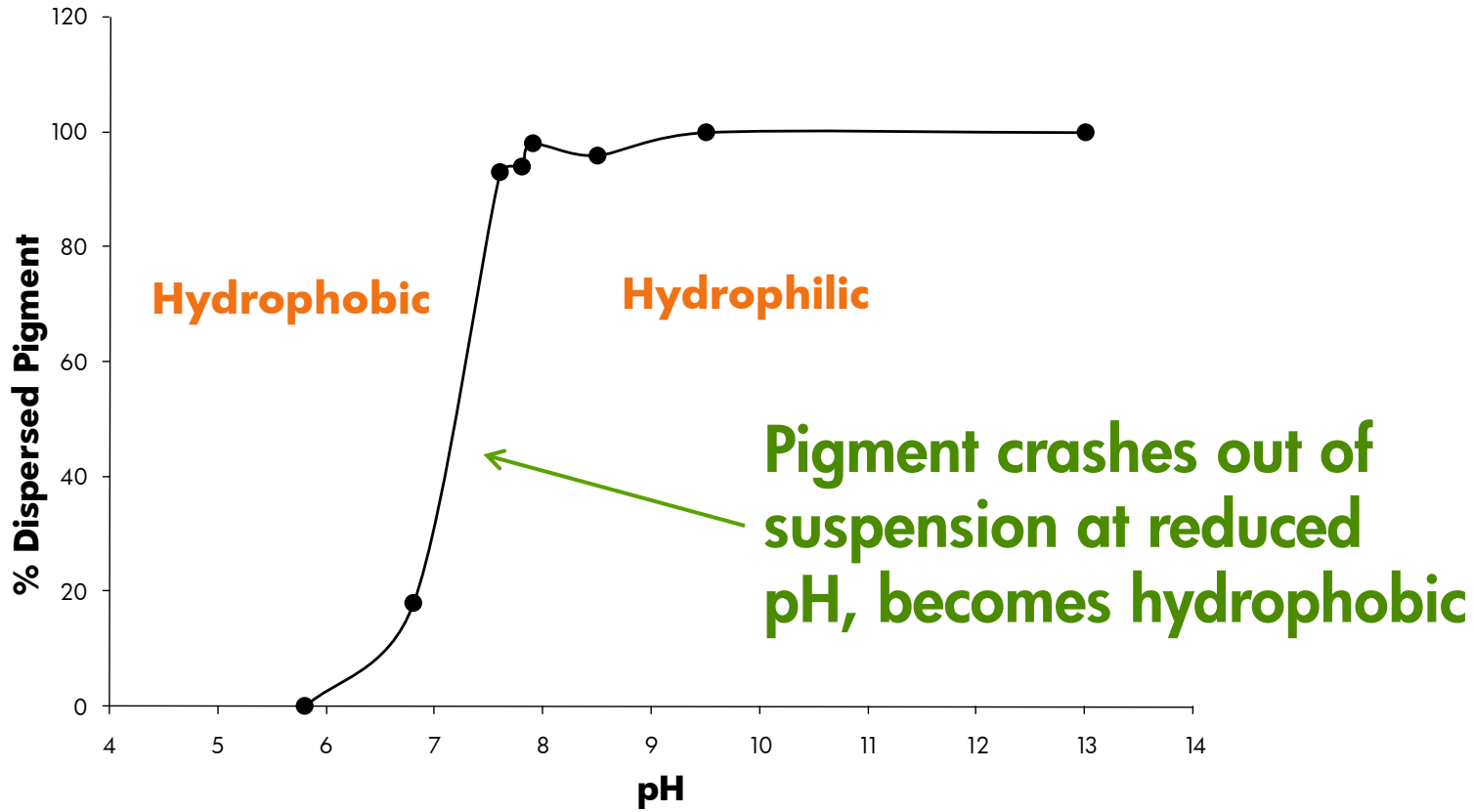
Objectives

- Discuss parameters that positively affect inkjet deinkability.
- Discuss how the hydrophobicity and particle size of inkjet inks can be enhanced for improved floatation deinking.
- Share new results on the deinkability of HP pigmented inks
  - As a function of paper composition
  - As a function of ink design



HIT PRINT RESPONSIBLY

Effect of pH on a typical HP pigmented ink

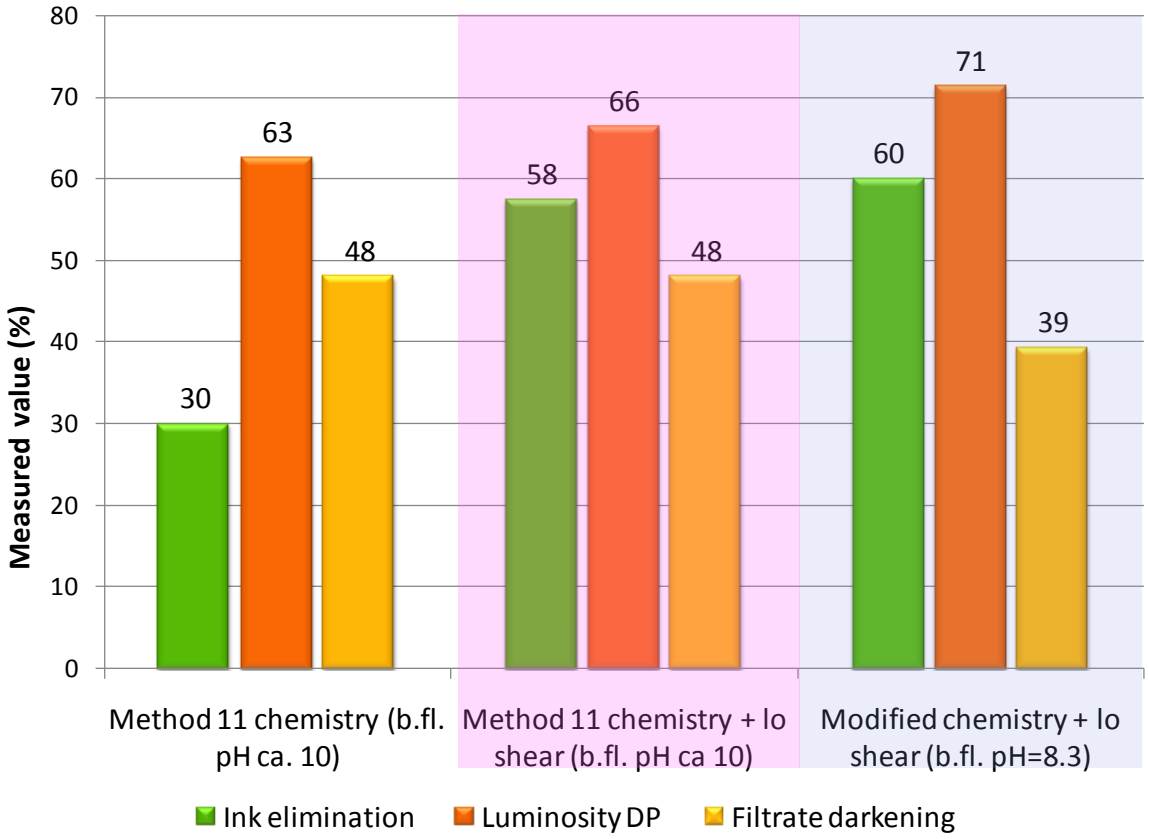


- Ink samples prepared at varying pH, centrifuged
- Light absorbance measured on supernatant and compared to 'stable' control at alkaline pH

Deinkability results

Flotation process variations, wood-free paper

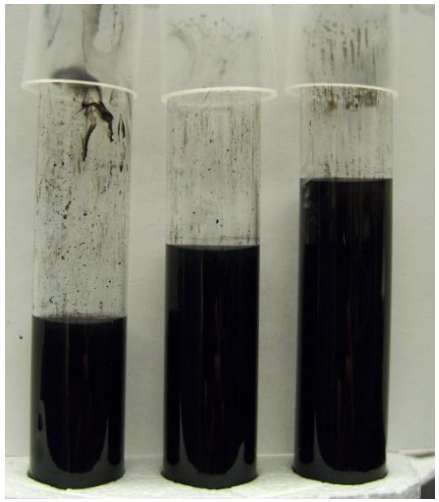
Variations in shear and pH



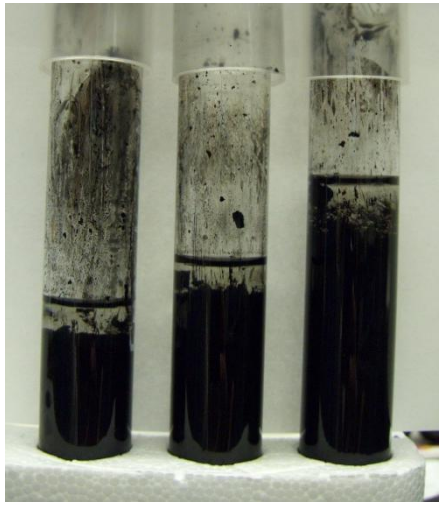
Sample: INGEDE test file on Xerox office paper

Effect of coagulants on a typical HP pigmented ink → generation of agglomerates

Sample #1



Sample #2



Coagulated Ink

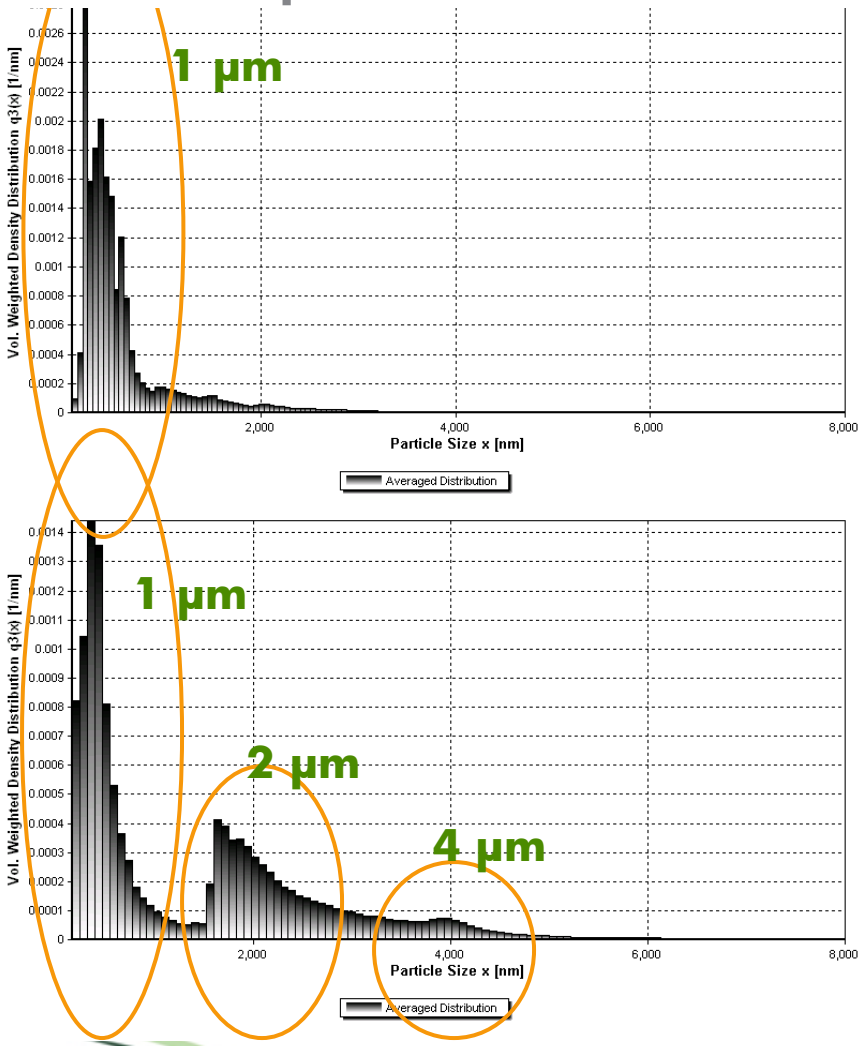
HIT PRINT RESPONSIBLY

Effect of coagulants on a typical HP pigmented ink, continued

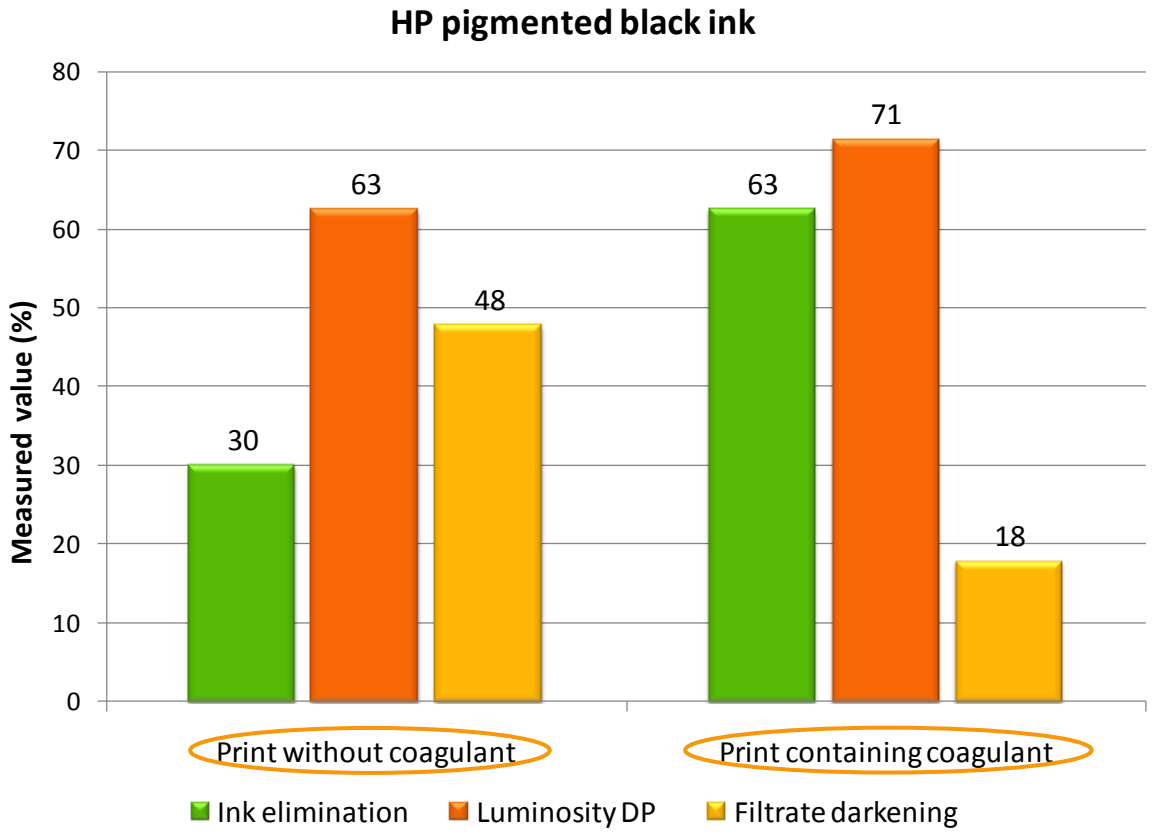
Sample #1

Sample #2

Estimated particle size distribution

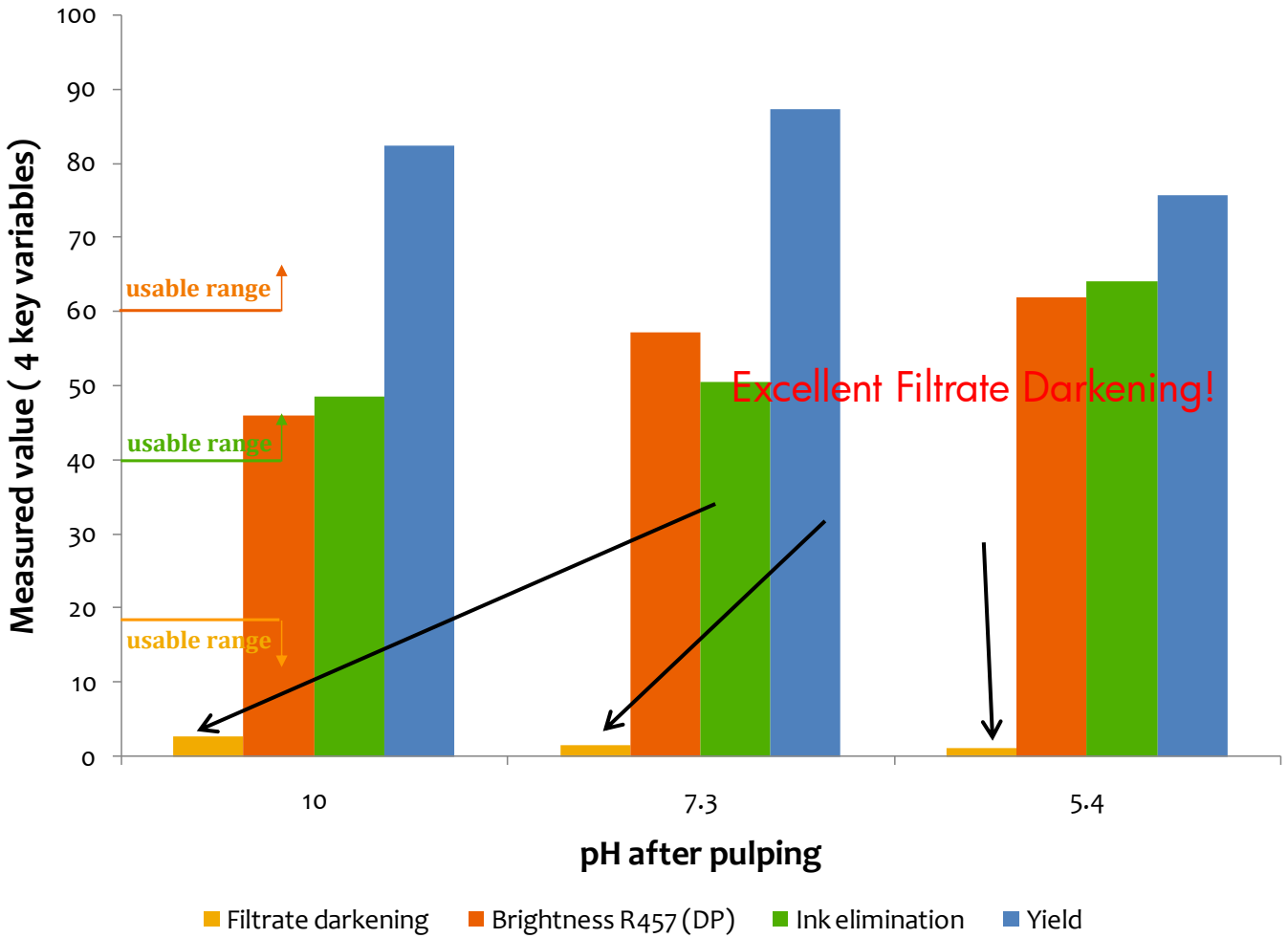


Coagulant destabilization
Effects on deinkability, wood-free paper



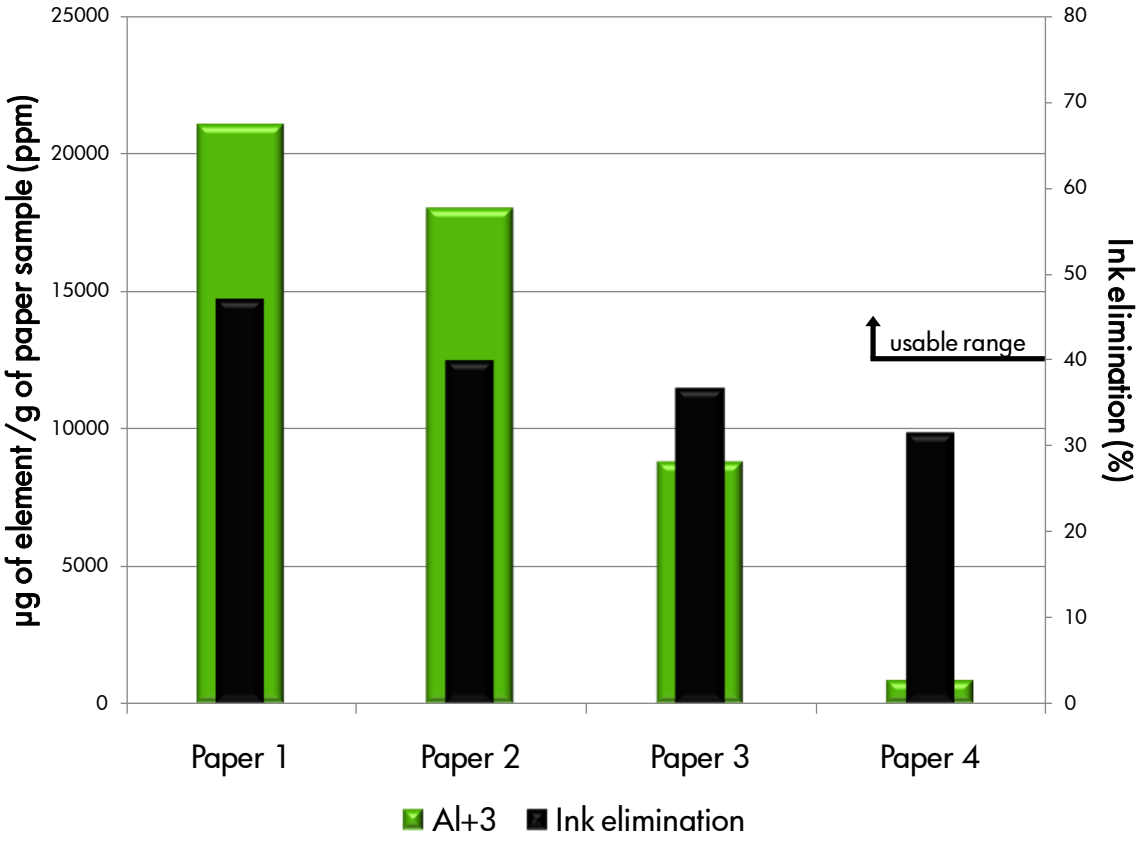
The particle size of the pigment agglomerates will be larger in the presence of coagulants in the paper – which correlates to improved deinkability

Effect of pH on deinkability of HP black pigment IJ ink on TMP media



New results: Deinkability of HP black pigmented ink printed on paper containing mechanical pulp

Conditions: modified method 11 chemistry and low shear



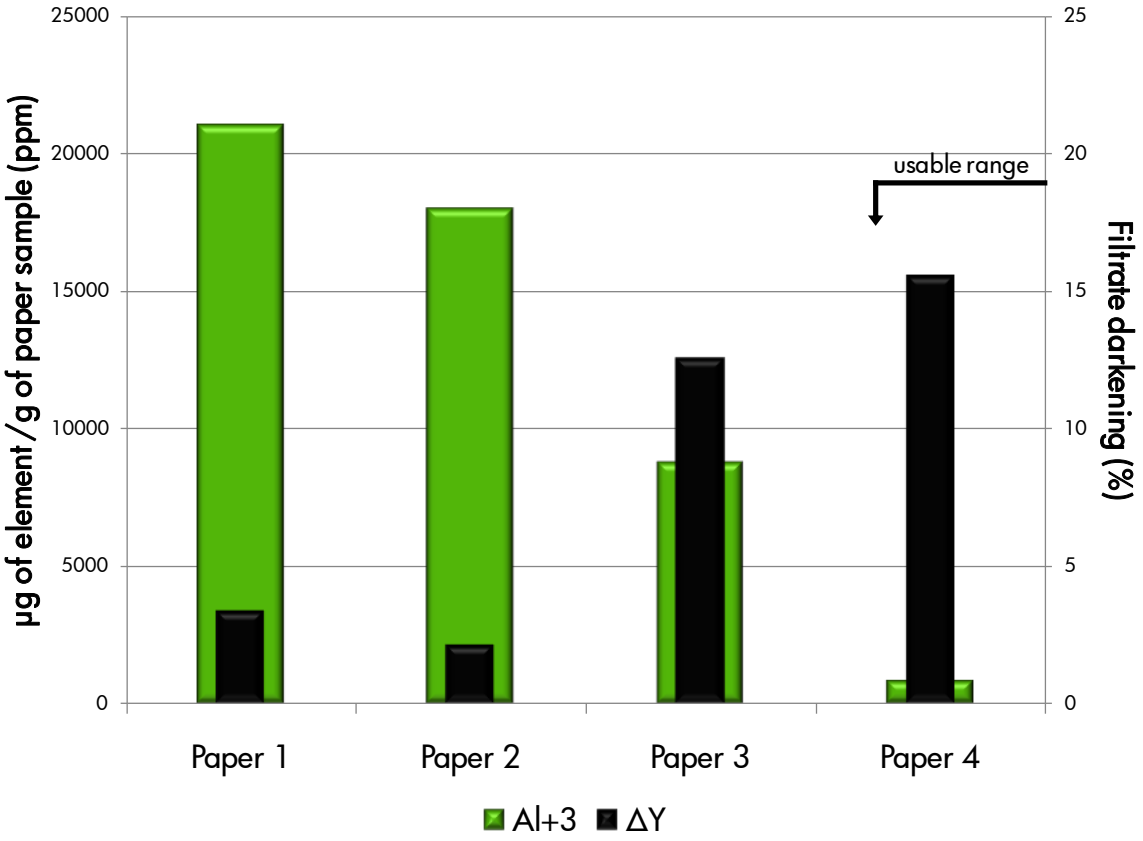
Ink Elimination correlates to Aluminum concentration!

Average pH before flotation = 8.5

HIT PRINT RESPONSIBLY

New results: Deinkability of HP black pigmented ink printed on paper containing mechanical pulp

Conditions: modified method 11 chemistry and low shear



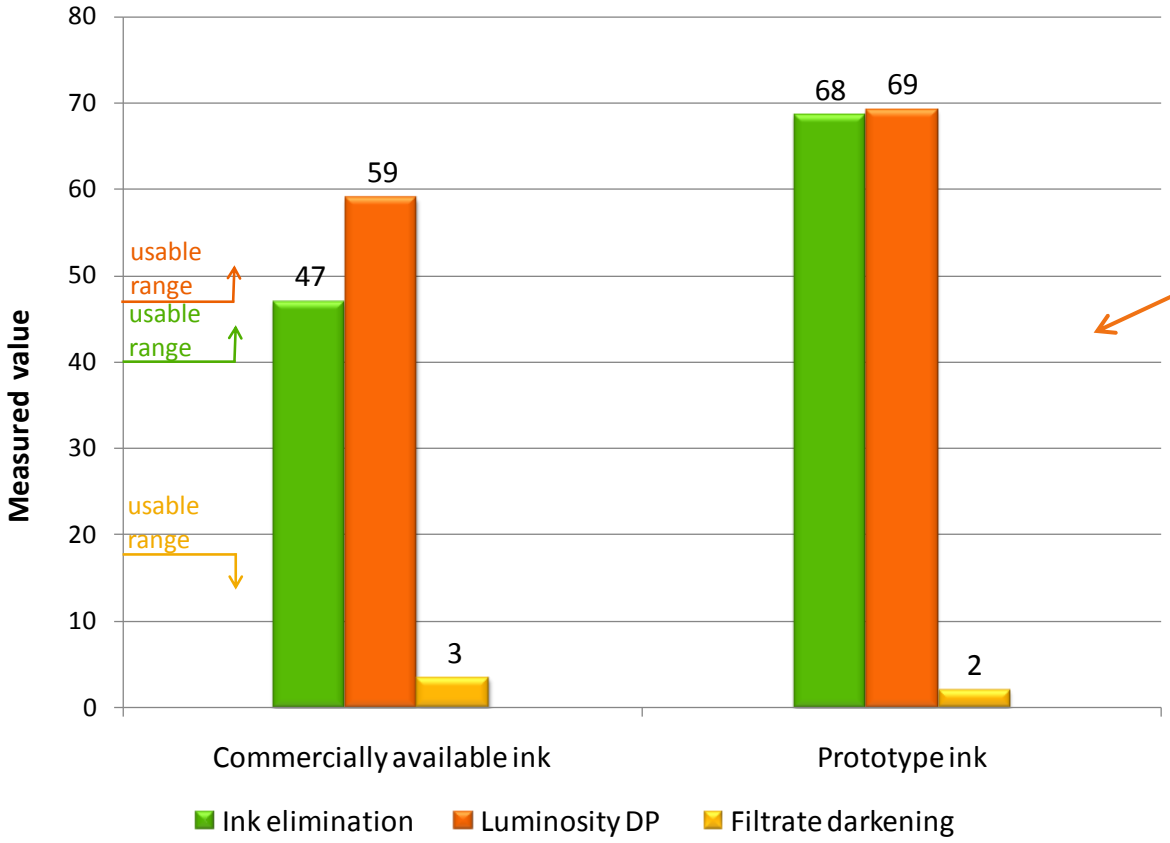
Filtrate darkening correlates to Aluminum concentration!

Average pH before flotation = 8.5

HIT PRINT RESPONSIBLY

New results: Ink Variation
Current vs. prototype HP pigmented ink

Conditions: low shear + method 11 chemistry



Prototype ink shows improved deinking

Sample: INGEDE test file on paper containing mechanical pulp

HIT PRINT RESPONSIBLY

Conclusions

- Flotation of inkjet inks is enhanced when:

  …Pigment hydrophobicity increases

  …Pigment particle size increases

  → Solutions could include coagulating agents and choice of pH in the deinking process

  …There is an increased Al^{+3} content in the paper
  - More work is needed to understand the mechanism and the potential impact on other mill variables.
  - This may explain previous positive deinking results obtained on the HP web press

- New prototype inks show improved deinking.
- Continue to engage with paper companies to better understand ink and media interactions.

HIT PRINT RESPONSIBLY