Flat Books on a High-Speed Inkjet Press

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High-Speed Inkjet Press Basics

HP’s T410 continuous-feed color inkjet press is capable of producing high-quality prints, at printing speeds of up to 800 feet per minute. This high processing rate makes it difficult to control phenomena such as paper curl in finished book products.

Bench-Scale Methods

1) Continuous rotating paper feed
2) T410 printer
3) Dryer
4) Moisturizer
5) Inner paper core
6) Moisturizer

Chemical Selection Basis

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<tr>
<th>Cost</th>
<th>Safety</th>
<th>Durability</th>
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<tr>
<td>Non-toxic</td>
<td>Non-flammable</td>
<td>Non-reactive</td>
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<tr>
<td>Limit adverse effects on ink:</td>
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<tr>
<td>Smearing</td>
<td>Ink degradation</td>
<td>Ink color alteration</td>
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T410 Inkjet Press Results

Verification of book ‘waviness’ Height Number

Bench Scale Results

Chemical concentration vs. curling height

Figure 1: Curve height against concentration of chemical additive. There is a clear trend of decreasing curl height with increasing chemical concentration. All data was recorded one hour after the spray process. Chemical 3 was insoluble in water above 20 wt%.

Figure 2: Curve height as a function of time. All chemical concentrations were held constant at 20 wt%. Chemical 3 contains an internal salt and was expected to show the least amount of variation over time. Chemicals 1 & 2 have similar boiling points but chemical 1 has a much larger molecular weight, which explains why it's more stable within the paper matrix.

Current Anti-Curl Technique

- Moisturizer equipment to apply water/surfactant solution
- Applies moisture up to 4 g/m² for paper

Problems With Paper Curl

- Frequency and magnitude of waves are functions of:
  - Dryer temp, paper speed
  - Moisturizer application

Objectives

- Identify 2-3 ideal chemical additives (via bench scale testing) which show the greatest curl control
- Run trials on commercial-scale T410 inkjet press to assess feasibility

References

4. Parker Science Photo Library