Technical Information

Ink Mileage / Consumption

Rely on us.

Flint Group
The Mileage of an ink describes how many grams of ink are required per square meter of paper in order to achieve a pre-determined density.
What influences ink-mileage?

- Pigment content of the ink-formulation.
- Ink transfer through the ink roller system, or the ability of an ink to split (rheology).
- Capillary action of the paper stock in use, the action of stock attracting ink.
- Water / ink balance behaviour of the ink formulation.
- Ink management systems – Pre-press adjustments like UCR etc.
Ink Mileage - Measurement Methods

Laboratory Method

- There currently exists no international industrial norm to determine ink mileage.

- Usually the mileage test in the laboratory can be based on ISO 2846-1 Norm. This is the Norm for an ink producer to determine and check the colourspace of primary colours – „Farbort-Norm“.

- **ISO 2846-1 method** (nutshell): Lab prints from 0.7 to 1.1gr/m2 replicate a range of printed densities. A defined paper (APCO II) is used for this evaluation. Based on the density results a calculation of mileage can be made.

- **Mileage trial by white-colour reduction**. This is a very unreliable and subjective test method.
Ink Mileage - Measurement Methods

Laboratory Method - Sample

Yellow 2 HF 276000 (KW 27) 27.06. - 03.07.2009

\[ y = 0.9133x + 0.3975 \]
Laboratory Method  

Steps:

1. Preparation of inks in buckets (20-50kg) – Description, with ink A, ink B etc.
2. Weighing of all the buckets on a weigh scale with min. two decimal places.
3. Stop a long run production to remove ink from the ink duct completely.
4. Feed in the ink from the prepared buckets by hand to the duct.
5. Start the production again and run with same density as before the stop.
6. Print a defined number of total copies.
7. Stop the production and remove the trial ink from the duct, put all the removed ink in the original buckets.
8. Re-weigh all the buckets again – difference in weight will be the ink-consumption.
9. Repeat step 4-8 again with the next buckets for trial.

This test procedure ensures that each ink formulation has been tested under exactly the same circumstances – same press, same paper, same density, etc.
Sample from Practice Trial

**Mileage trial "FG vs. Competition X"**

- **Date**: 29.08.2008
- **Press**: LithoPrint IV - 72pp
- **Job**: MEDIA MARKT
- **Paper**: UPM News H
- **Speed**: 40,000 iph

**Procedure**

By weighing buckets before and after printing an defined amount of copies (between 34,348 and 49,455)

<table>
<thead>
<tr>
<th>inkseries</th>
<th>Flint Group</th>
<th>Comp. X</th>
<th>consumption kg per 1000 copies</th>
<th>%diff. +/-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>X series</td>
<td>X series</td>
<td>(0,604)</td>
<td>(0,605)</td>
</tr>
<tr>
<td>Cyan</td>
<td>226000</td>
<td>X series</td>
<td>0,339</td>
<td>0,343</td>
</tr>
<tr>
<td>Magenta</td>
<td>246000</td>
<td>X series</td>
<td>1,098</td>
<td>1,074</td>
</tr>
<tr>
<td>Yellow</td>
<td>274200</td>
<td>X series</td>
<td>1,282</td>
<td>1,402</td>
</tr>
</tbody>
</table>

Faktorrechnung

- **Black Faktor**: 16
- **Cyan Faktor**: 21
- **Magenta Faktor**: 21
- **Yellow Faktor**: 42

Verhältnisberechnung

- **Black Faktor**: 16
- **Cyan Faktor**: 21
- **Magenta Faktor**: 21
- **Yellow Faktor**: 42

**Report by**: Peter Krumholz
Ink Mileage - Measurement Methods

Unreliable Methods

- Judgement based on monthly ink consumption calculations – influences of ink-coverage on certain jobs and the used paper qualities cannot be ignored as they have an influence.

- Judgement based on the gap of ink-duct knife. Each ink type has a different transfer behaviour, requiring a different ink film thickness on the duct roller, in order to feed the desired amount of ink.
## INK Mileage - Influence of Paper Stock

### Sample

<table>
<thead>
<tr>
<th>Papier</th>
<th>DV</th>
<th>Ergiebigkeit [g/m²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norske Skog NORX 59 - 45 g/m² - BRUCK AT</td>
<td>1,10</td>
<td>1,570</td>
</tr>
<tr>
<td>Norske Skog NORX 59 - 45 g/m² - GOLBEY AT</td>
<td>1,10</td>
<td>1,437</td>
</tr>
<tr>
<td>UPM News H - 45 g/m² - Steyrermühl AT</td>
<td>1,10</td>
<td>1,428</td>
</tr>
<tr>
<td>UPM News H - 45 g/m² - Schongau DE</td>
<td>1,10</td>
<td>1,469</td>
</tr>
<tr>
<td>Sachsen Mill Flyopress O - 45 g/m²</td>
<td>1,10</td>
<td>1,445</td>
</tr>
<tr>
<td>Holmen XLNT 72 - 55 g/m²</td>
<td>1,10</td>
<td>1,302</td>
</tr>
</tbody>
</table>

**Remark:** Flint Group does not wish to criticise the paper manufacturers as mileage is not their first goal in production. But this sample demonstrates the influence of paper stock on the mileage of an ink.

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*Worst mileage: Norske Skog NORX 59 - 45 g/m² - GOLBEY AT, 1.437 g/m²*

*Best mileage: Holmen XLNT 72 - 55 g/m², 1.302 g/m²*
INK Mileage - Influence of Paper Stock

Different paper surfaces - different ink consumption

Pictures and Graphics: UPM Kymmene
Heatset Ink - Mileage

Flint Group runs a clear strategy in mileage / pigmentation of heatset inks.

Standard-Pigmentation: **Ink series 2000 – 4000 – 6000**
- Ensure best press-behaviour and runability properties by economical consumption figures.
- Best suitable to use for standardization in regards to ISO12467-2.
- Meets the ISO 2846-1 Norm

High Strength Pigmentation: **Ink series 2200 – 4200**
- High strength ink-series, consider as a speciality for special demands.
- Meets the ISO 12467-2 Norm
- Meets the ISO 2846-1 Norm

“Last words“: High strength is not necessarily the most economical choice. The pigmentation of an ink cannot be extended endlessly. The goal is to find a fair and proper working system of ink- solutions to ensure the best and most economical industrial application.
Rely on us.

Flint Group