

## Information sheet

# Inking Methodology

## Helping you meet OPRL guidance for ink levels on film packaging

An inking methodology has been developed to help OPRL members achieve ink levels of less than 5% by weight for film packaging, in line with OPRL guidelines.

This inking methodology will enable brands and retailers to make an initial assessment to ensure ink levels in film packaging are below the required 5% by weight of the overall packaging. All OPRL members who wish to use the new OPRL film label must meet this requirement. This threshold was introduced to safeguard the quality of collected film.

Prior to making an assessment of the % weight of ink, each member will need to understand:

- The film grammage;
- The printing process used – either flexo or gravure; and
- The total % coverage of white and coloured ink.

### The film grammage

The grammage (gsm or  $\text{g/m}^2$ ) of film is equal to the density multiplied by the thickness (microns/ $\mu\text{m}$ ) of film. If the grammage of film is unknown then a density calculation of between 0.9-1  $\text{g/cm}^3$  can be applied and then multiplied by the film thickness.

The grammage of plastic film will vary across pack formats to optimise the protection, containment and delivery of the product through the supply chain to the end user.

The film grammage usually differs across product categories with the examples below illustrating the range of potential variances:

- |                                     |           |
|-------------------------------------|-----------|
| ■ Toilet roll bags                  | 19-38 gsm |
| ■ Bread bags                        | 23-38 gsm |
| ■ Fresh produce bags                | 23-48 gsm |
| ■ Frozen food bags                  | 33-76 gsm |
| ■ Shrink film for multi drink packs | 42-62 gsm |

For all calculations we have assumed a density of 0.95  $\text{g/cm}^3$ .

### The printing process

The two most widely used printing methods for flexible packaging are flexography and rotogravure:

- Flexography (often abbreviated to flexo) is a form of printing process which utilizes a flexible relief plate. It is basically an updated version of letterpress that can be used for printing on almost any type of substrate including plastic, metallised films, plastic film, and paper,
- Rotogravure (roto or gravure for short) is a type of intaglio printing process; it involves engraving the image onto an image carrier. In gravure printing, the image is engraved onto a cylinder and like flexography, it uses a rotary printing press.

The printing process will dictate the ink film weight, with the following guidance assisting this assessment based upon 100% white and colour coverage.

Where the film packaging has 100% white ink coverage:

- When printed with flexo, the amount of white ink is equal to  $0.5\text{-}1.0\text{g/m}^2$
- When printed with gravure, the amount of white ink is equal to  $1.0\text{-}2.0\text{g/m}^2$

Where the film packaging has 100% colour ink coverage:

- When printed with flexo, the amount of colour ink is equal to  $0.4\text{-}0.7\text{g/m}^2$
- When printed with gravure, the amount of colour ink is equal to  $0.8\text{-}1.5\text{g/m}^2$

### The total % coverage of white and coloured ink

Finally, an assessment of ink coverage will need to be made in order to calculate the total ink weight. In some cases e.g. frozen food and bread bags, 100% coverage of white ink will be applied with 25% coverage of colour ink applied over this.

### Ink weight measurement matrix

Once the information has been gathered from steps 1-3 above the ink weight measurement matrix (Table 2) then provides a basic guide to help understand whether the ink level is below the required 5% by weight of the overall packaging. The areas highlighted are where the ink weight ranges fall within a level which may require members to seek further verification from their printers on actual ink weights. The matrix is to be used as a guide only, with variances likely to occur within each printing process. For each process the highest number within the range of grams per square meter has been applied to the measurement matrix.

As shown in Table 1, for many packs there will be a mix of white and colour ink. A calculation will therefore need to be made for both the total coverage of white and colour ink to arrive at a total % ink weight.

**Table 1: Examples of pack calculations.**

	(a) Film grammage <sup>1</sup>	(b) Ink coverage	(c) Printing process	% of Ink
Frozen food bag (peas)	42.75 gsm or ( $45\text{ }\mu\text{m} \times 0.95\text{ g/cm}^3$ )	100% white 90% colour	<b>Flexo</b> White: 1 gsm Colour: 0.7 gsm	White: $c/a \times b = 2.3\%$ Colour: $c/a \times b = 1.5\%$ <b>Total % Ink Weight = 3.8%</b>
Bread bag	23.75 gsm or ( $25\text{ }\mu\text{m} \times 0.95\text{ g/cm}^3$ )	100% white 65% colour	<b>Flexo</b> White: 1 gsm Colour: 0.7 gsm	White: $c/a \times b = 4.2\%$ Colour: $c/a \times b = 1.9\%$ <b>Total % Ink Weight = 6.1%</b>
Toilet roll bag	28.50 gsm or ( $30\text{ }\mu\text{m} \times 0.95\text{ g/cm}^3$ )	75% white	<b>Flexo</b> White: 1 gsm	Colour: $c/a \times b = 2.6\%$ <b>Total % Ink Weight = 2.6%</b>

<sup>1</sup> If the film grammage is a known value, use it directly for the calculation; if grammage is unknown but the thickness (in microns) is known, the grammage can be calculated multiplying the thickness by the density (estimated as  $0.95\text{g/cm}^3$ )

The matrix below calculates % ink weight for both the flexo and gravure printing processes. As a guide this calculation assumes 100% coverage of white and colour ink. Each product line will have a mix of white and colour ink with total coverage dictating the final calculation in understanding %ink weight. The shaded sections show where the % ink coverage falls close or above the 5% threshold.

**Table 2: Ink Weight Measurement Matrix – white & colour at 100% ink coverage.**

100% White Coverage						100% Colour Coverage					
Film grammage	Printing process <sup>†</sup>	% Ink weight	Film grammage	Printing process	% Ink weight	Film grammage	Printing process	% Ink weight	Film grammage	Printing process	% Ink weight
gsm	Flexo	%	gsm	Gravure	%	gsm	Flexo	%	gsm	Gravure	%
20	1	5.0	20	2	10.0	20	0.7	3.5	20	1.5	7.5
25	1	4.0	25	2	8.0	25	0.7	2.8	25	1.5	6.0
30	1	3.3	30	2	6.7	30	0.7	2.3	30	1.5	5.0
35	1	2.9	35	2	5.7	35	0.7	2.0	35	1.5	4.3
40	1	2.5	40	2	5.0	40	0.7	1.75	40	1.5	3.75
45	1	2.2	45	2	4.4	45	0.7	1.6	45	1.5	3.3
50	1	2.0	50	2	4.0	50	0.7	1.4	50	1.5	3.0
55	1	1.8	55	2	3.6	55	0.7	1.3	55	1.5	2.7
60	1	1.7	60	2	3.3	60	0.7	1.2	60	1.5	2.5
65	1	1.5	65	2	3.1	65	0.7	1.1	65	1.5	2.3
70	1	1.4	70	2	2.9	70	0.7	1.0	70	1.5	2.1
75	1	1.3	75	2	2.7	75	0.7	0.9	75	1.5	2.0
80	1	1.3	80	2	2.5	80	0.7	0.9	80	1.5	1.9

While we have tried to make sure this information sheet is accurate, we cannot accept responsibility or be held legally responsible for any loss or damage arising out of or in connection with this information being inaccurate, incomplete or misleading. This material is copyrighted. You can copy it free of charge as long as the material is accurate and not used in a misleading context. You must identify the source of the material and acknowledge our copyright. You must not use material to endorse or suggest we have endorsed a commercial product or service. For more details please see our terms and conditions on our website at [www.wrap.org.uk](http://www.wrap.org.uk)

**Waste & Resources  
Action Programme**

The Old Academy  
21 Horse Fair  
Banbury, Oxon  
OX16 0AH

Tel: 01295 819 900  
Fax: 01295 819 911  
E-mail: [info@wrap.org.uk](mailto:info@wrap.org.uk)

Helpline freephone  
0808 100 2040

[www.wrap.org.uk/opri](http://www.wrap.org.uk/opri)

