

Paper industry's requirements for the quality of paper for recycling as raw material for graphic products –

Quality of collected paper for recycling and its processing

Warsaw, 29 October 2013



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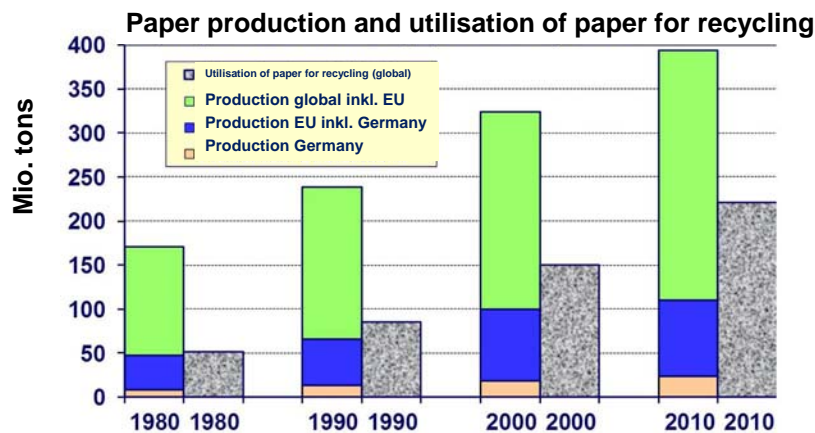
Andreas Faul, Anne-Kathrin Kuna
 INGEDE Office

Berliner Recycling- und Rohstoffkonferenz 4./5. März 2013

04./05. März 2013

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Development of the paper production and the use of paper for recycling

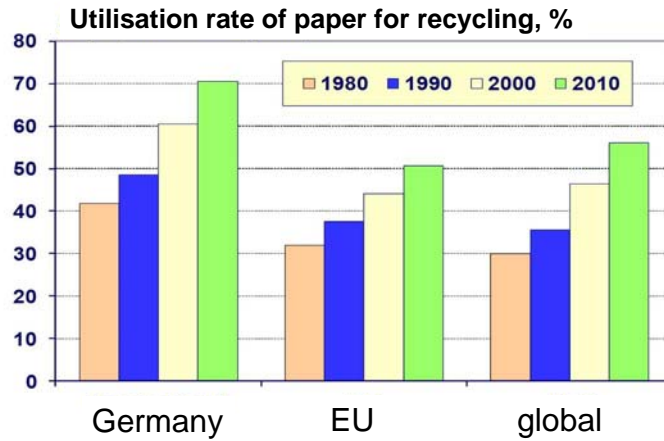


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Source: Zellcheming RECO

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Development of utilisation rate of paper for recycling; global and regional



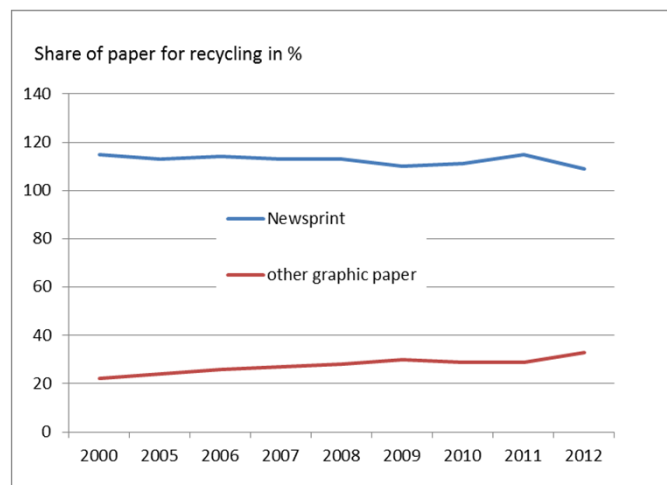
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Source: Zellcheming RECO

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Paper for recycling utilisation in Germany



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Source: VDP

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Paper and board – European list of standard grades of paper and board for recycling (EN 643)



- Group 1: Ordinary grades
- Group 2: Medium grades
- Group 3: High grades
- Group 4: Kraft grades
- Group 5: Special grades



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The most important grades according to the prospective EN 643

1.01.00: Ordinary mixed paper and board

A mixture of various grades of paper and board, unwanted material removed

1.02.00: Mixed paper and board

A mixture of various qualities of paper and board, containing a maximum of 40% newspaper and magazines

1.04.00: Corrugated paper and board packaging

Used paper and board packaging, containing a minimum of 70% of corrugated board, the rest being other packaging papers and boards

1.11.00: Sorted graphic paper for deinking

Sorted graphic paper close to household collection, newspaper and magazines, each with a minimum share of 40%; non-paper components and unwanted materials are limited to 3%



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Inappropriate material are unwanted paper and boards and non-paper components (metal, plastics, glass, textiles, wood, sand and building materials, synthetic materials)

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Examples for medium, high and special grades

Group 2: Medium grades

- 2.02.01 Unsold newspapers and inserts
- 2.03.01 Lightly printed white shavings, mainly mechanical
- 2.06.00 Coloured letters (print and office paper, free of carbonless copy paper and file covers)

Group 3: High grades

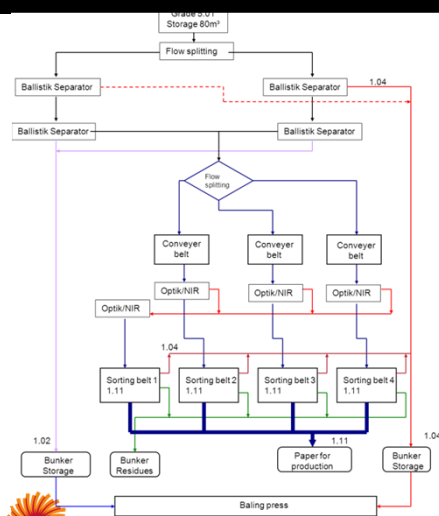
- 3.05.01 White wood-free letters
- 3.14.00 White newsprint, unprinted free from magazine paper
- 3.15.00 White coated mechanical pulp-based paper
- 3.17.00 White shavings



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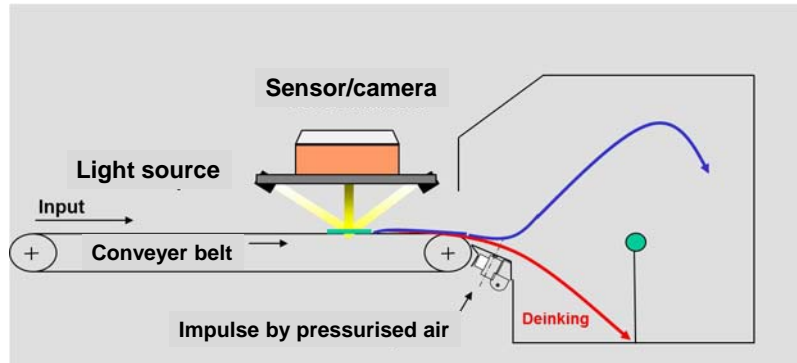
Flow sheet and picture of the sorting plant Sachsen Mill



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Opto- electronical sorting system



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Sorting plant Sachsen Mill

Input: 5.01.00

Output:

- 14 – 16 % 1.02
- 12 – 14 % 1.04
- 66 – 68 % 1.11
- 1 – 3 % Rejects/outthrows

Share of graphic papers:

- about 40 %
- 5 – 10 %
- 96 – 98 %*

*) The sum of unwanted material (board, plastics ...) is still 2 – 4 % although it is sorted manually afterwards.



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Sorting plant Sachsen Mill

Examples for outthrows

- Dead small animals
- Firework articles, combustible materials
- Syringes, bandaging material
- Used napkins and sanitary articles
- Electronic scrap
- Plastic containers, oil cans
- Parts of bicycles and mopeds, tubes, tires
- Motor parts
- Beverage cans
- Powder from burst boxes and insufficiently emptied bags: Pesticide, carbonate, cement, tartaric acid ...
- Demolition waste, stones

High danger potential

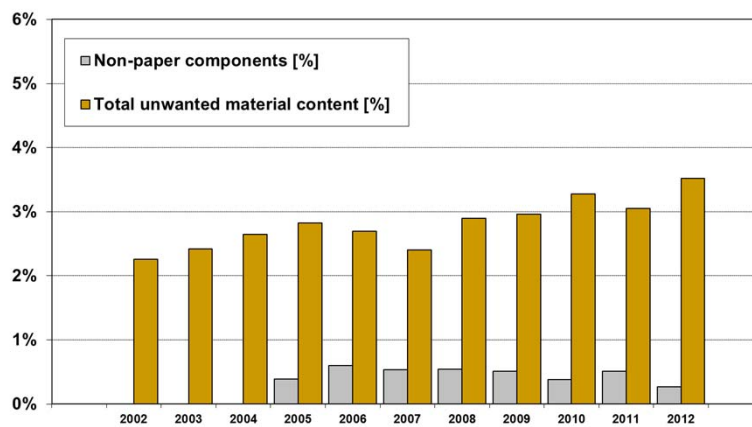


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INGEDE Monitoring System – Unwanted Material

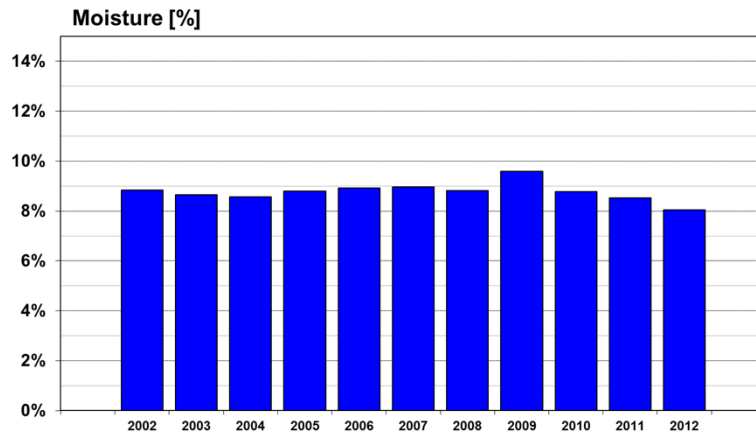


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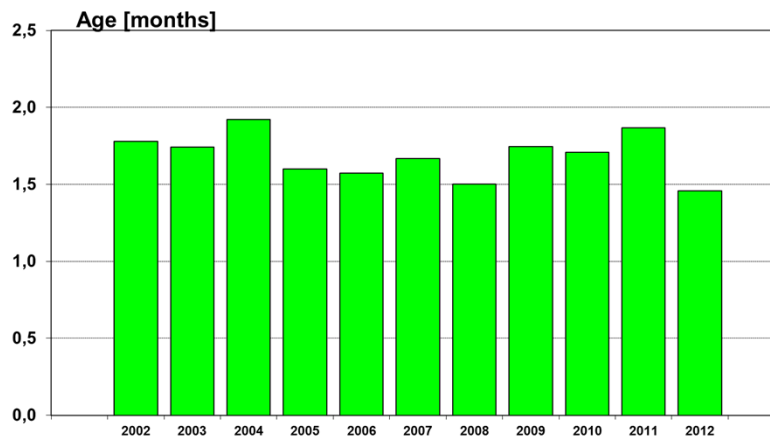
INGEDE Monitoring System – Moisture



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INGEDE Monitoring System – Age



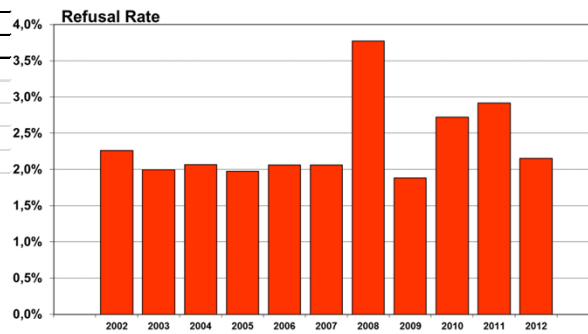
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INGEDE Monitoring System – Reasons and Rate of Refusals

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Unwanted material	Rank 1	Rank 1	Rank 1	Rank 1	Rank 1	Rank 1	Rank 1	Rank 1	Rank 1	Rank 1	Rank 1
Unwanted papers	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2
Non-paper components	Rank 3	Rank 3	Rank 3	Rank 3	Rank 3	Rank 3	Rank 3	Rank 3	Rank 3	Rank 3	Rank 3
Moisture	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2
Bale quality	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2	Rank 2

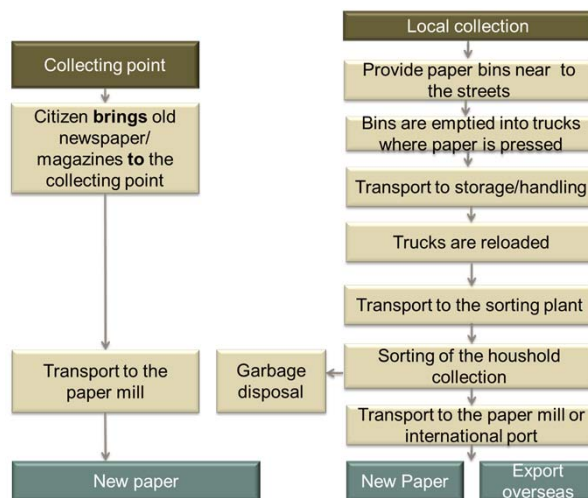
Ranking of reasons	
Rank 1	Red
Rank 2	Pink
Rank 3	Light Pink



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Principle of local bring system



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The quality of alternative collected paper for deinking

Analysis of paper for deinking (grade 1.11) that was brought to the collecting points:

About 500.000 tonnes were delivered to Stora Enso Sachsen since 2001.

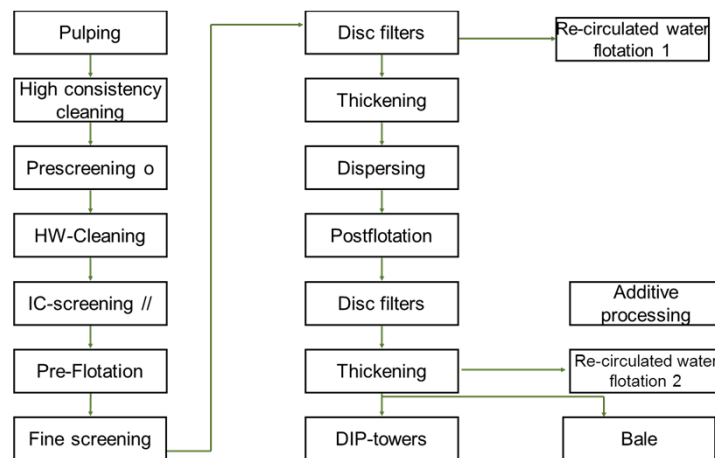
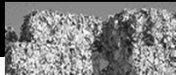
- Newspaper $60 \pm 5 \%$
- Magazines $40 \pm 5 \%$
- Other graphic paper $< 1 \%$
- Not suitable paper/grade $\text{max } 0,8 \%$
- Non-paper components 0



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Flow sheet of stock preparation Sachsen Mill



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Process yield data of typical deinking plants

Grade	Process	Yield
Standard (newsprint and similar)	1-loop	80–87 %
Standard (newsprint and similar)	2-loop	76–84 %
Improved (improved newsprint, SC, LWC, office)	2-loop	70–82 %
Pulp substitute	3-loop	60–70 %

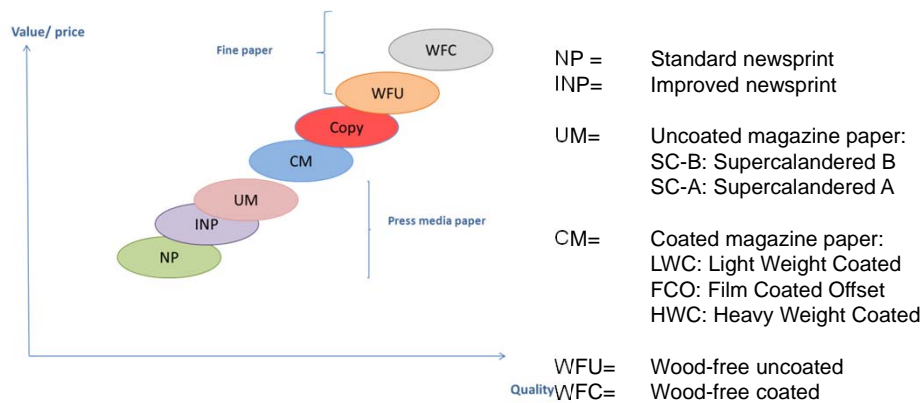


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Rough classification for grades of printing paper



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Use of recycled paper in graphic products

Paper grade	Use of paper for recycling	Standard grade of paper for recycling
NP	80 – 120 %	1.11
INP	0 – 120 %	1.11/...
UM:		
SC-B	80 – 120 %	1.06/1.11
SC-A	0 – 20 %	1.06/2.03/2.05/2.06
CM:		
LWC	0 – 20 %	1.11/3.15/5.05
FCO	80 – 120 %	1.06/1.11/2.03/2.05/2.06
Copy	0 – 120 %	2.05/2.06/3.04/3.10/3.14/3.15/3.16/3.18
WFU	0 % ...?	2.05/3.10/3.16/3.18



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Quality parameters for graphic paper

Mechanical properties

- Tear strength, tear growth resistance
- Dimension stability
- Picking, tensile strength in z-direction
- Abrasion resistance

Surface

- Roughness, Smoothness
- Friction

Optical properties

- Brightness, Luminosity
- Colour shade
- Gloss
- Cleanliness
- Opacity



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Important optical criteria for graphic paper

Paper grade	Brightness ISO 2470 (D65)	Dirt speck area INGEDE Method 2
Newsprint	60 %	100–300* mm ² /m ²
Improved Newsprint	65–80 %	50–250* mm ² /m ²
LWC, SC	65–85 %	
Copy paper	70–100 %	0–30 (?) mm ² /m ²
Fine paper	80–110 %	

*INGEDE's monthly DIP statistics

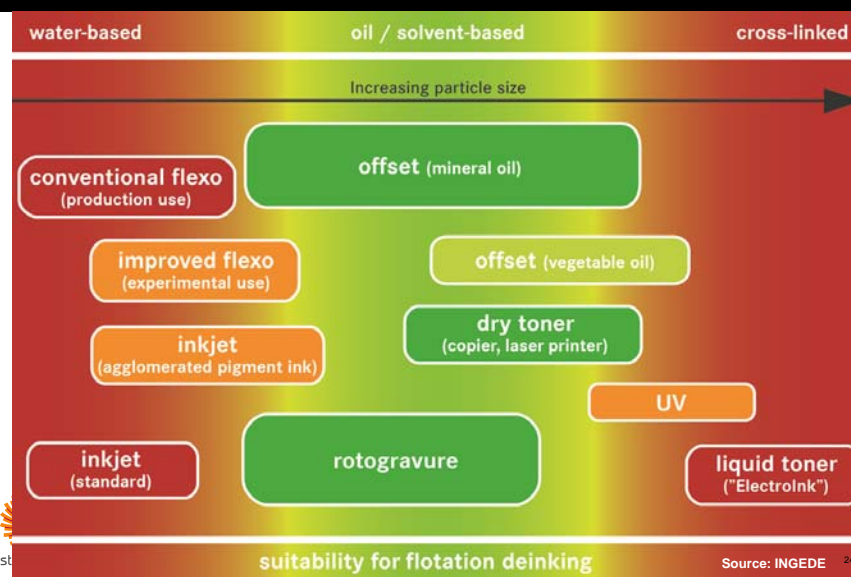


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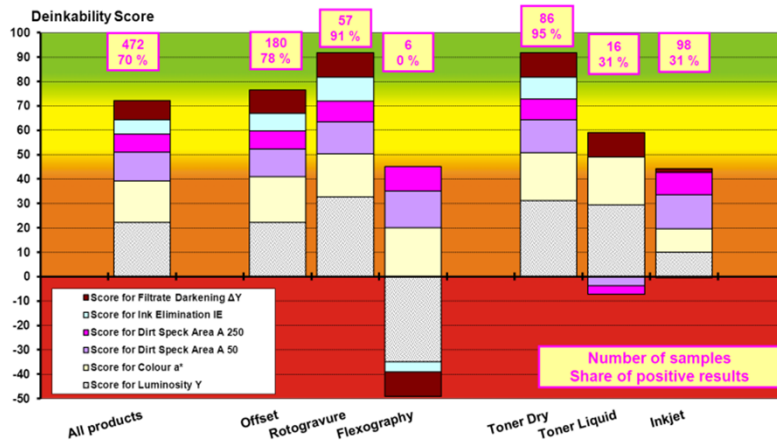
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Deinkability of printed products depending on the printing process

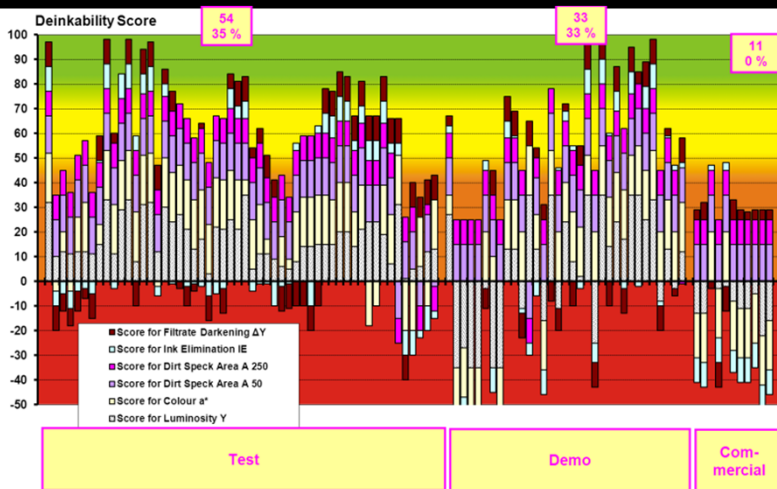


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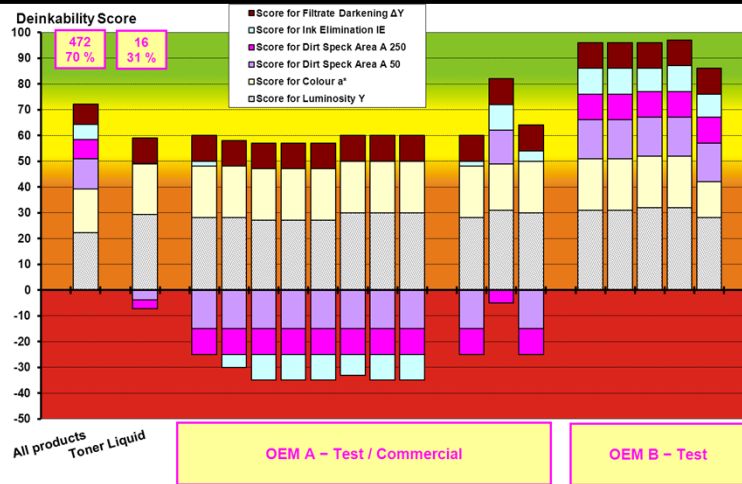
Deinkability results by printing technology



Deinkability results of test, demo and commercial inkjet prints



Deinkability results of liquid toner prints from different vendors



Waste status of paper for recycling

Position of the EU Commission:

After sorting: End of waste (EoW) status if

- non-paper components < 1,5%
- the quality is according to EN 643
 - free of dangerous material
 - no contamination with oil or other liquids

When does the waste status of paper for recycling begin?

Our opinion:

Separately handled products as newspapers and magazines, collected with a monitored system, e. g. bring system, **never** become waste.



Make it new from old



Paper for recycling
is raw material and not waste!



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Thank you!

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