

Deinkability Certification for Public Procurement and Marketing of Printed Products

Axel Fischer

**International Association of the Deinking Industry
(INGEDE)**

NIP25

September 21, 2009

Louisville, KY



Who is INGEDE?

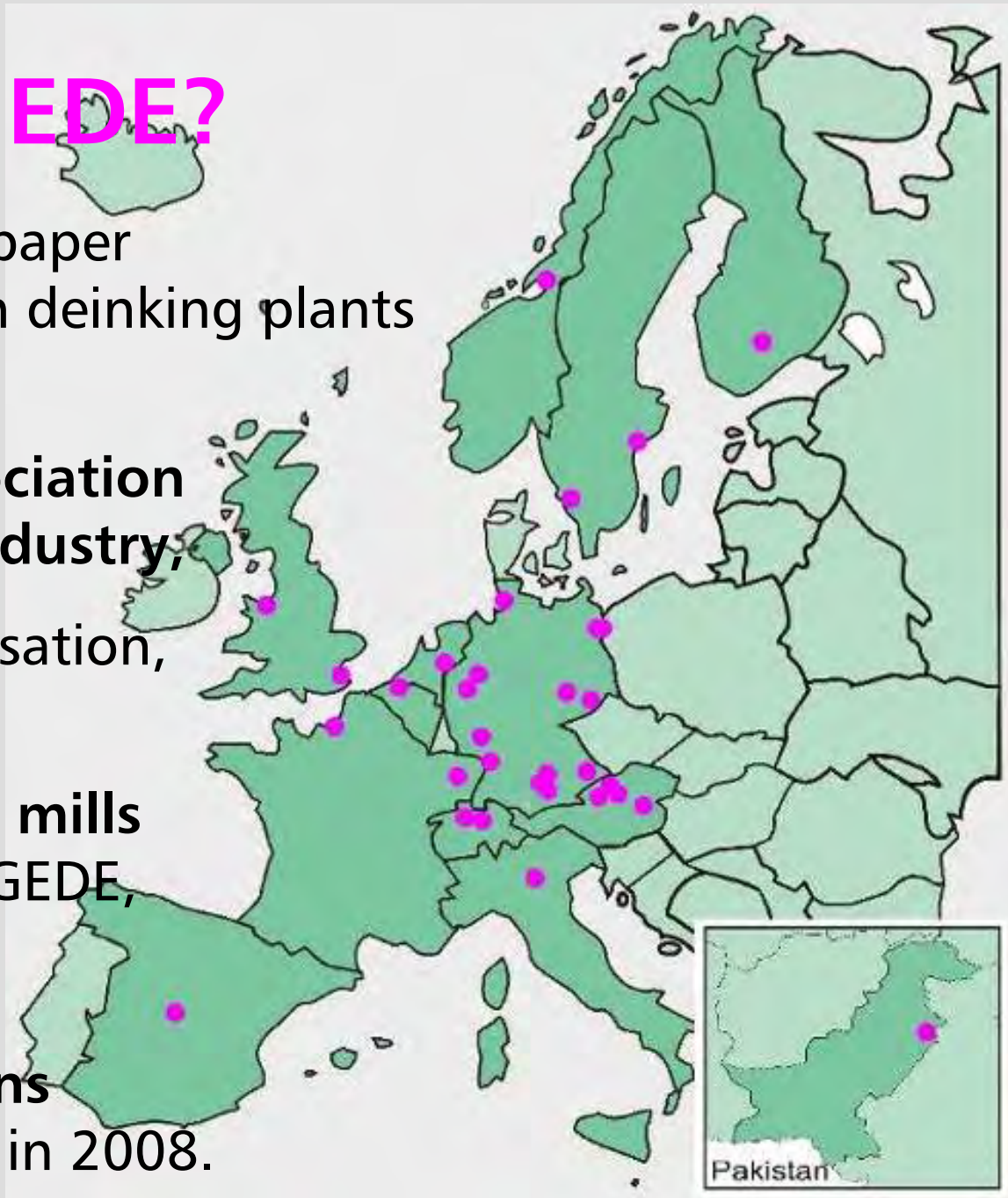
Leading European paper manufacturers with deinking plants

founded the **International Association of the Deinking Industry,**

a non-profit organisation, in 1989.

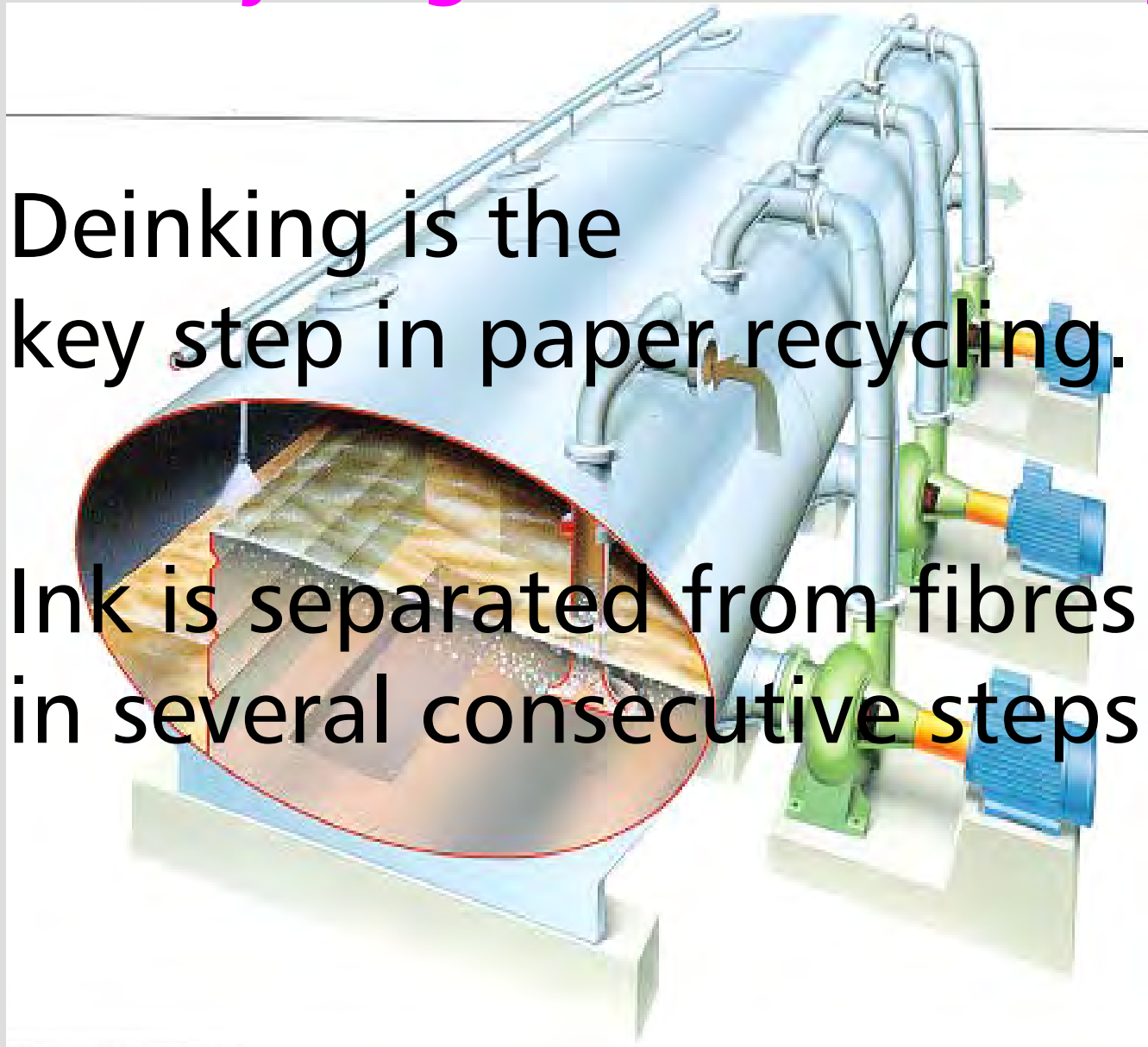
Currently **33 paper mills** are members of INGEDE,

who utilised about **10.3 Mio tons** of recovered paper in 2008.



Paper Recycling Process: Deinking

- Deinking is the key step in paper recycling.
- Ink is separated from fibres in several consecutive steps.



Paper Recycling Process: Deinking



~2,000 tons/day

Consequences for Printing Ink

Ink has to be

- hydrophobic
- particle $> 150 \mu\text{m}$ = screenable (stiff!)
- $30 \mu\text{m} < \text{particle} < 300 \mu\text{m}$ = cleanable
- $2 \mu\text{m} < \text{particle} < 100 \mu\text{m}$ = flatable
- particle $< 2 \mu\text{m}$ = problem

Problems with water based inks!

(Unless they form insoluble aggregates.)

Printers “Going Green”

- Random clicks from the web:

Printers "Going Green"



CO₂ friendly eco papers
Vegetable based inks
Real-time estimates



1-800-737-4308
SAVE TREES. PRINT GREEN

HOME

HOW TO ORDER

ENVIRONMENT

RESOURCES

MY ACCOUNT

Welcome! Please [sign in](#) or [register](#) so we can serve you better.

SELECT A PRODUCT

BOOKLETS (MULTIPAGE)

BOOKMARKS

BROCHURES

BUSINESS CARDS

CALENDARS 2010

CARDS

CATALOGS (MULTIPAGE)

ENVELOPES RECYCLED

GREETING CARDS

HANG TAGS NEW!

LETTERHEAD



NEW! Time saving tools for designers!

See the progress of your job online, approve and share PDF proofs with your clients using our web server.

NEW! Real-time Eco-audit!

Using our **ECO-SAVINGS CALCULATOR**, Green Printer tracks the amount of trees, CO₂ emissions, wastewater, energy and more you save with every print order. You can log onto your account and see

SPECIAL: GREETING CARDS WITH ENVELOPES

\$79

100

\$125

250

\$198

500

PAPER: 50% Recycled 100lb ChorusArt Cover Printed 4/1, scored with **FREE ENVELOPES**

SPECIAL: 2010 CALENDARS (DIGITAL)

\$699

100

\$1588

250

\$2325

500

Printers "Going Green"



Email Address

.....

log in

866-978-8547 toll free

| Email Us

| FAQ

Create Account

f t blog

CHOOSE A PRODUCT

Business Cards
Brochures **15% OFF!**
Booklets **15% OFF!**
Bookmarks
Calendars **15% OFF!**
Catalogs **15% OFF!**
CD/DVD Sleeves
Door Hangers
Greeting Cards
Hang Tags
Labels
Newsletters
Postcards
Posters
Presentation Folders
Rack Cards
Sell Sheets **15% OFF!**
Letterhead/Envelopes
Custom Sizes
Custom Quotes
View All Products...

SERVICES

Mailing
List Creation
Design Online

ECO-FRIENDLY PRINTING FOR ANY PROJECT

- Save money & be green
- Solutions to fit any budget
- Maximize your printing dollars

LEARN MORE



Affiliate Program

**BECOME A
GREENERPRINTER
AFFILIATE!**



New Certification

**CERTIFIED "B"
CORPORATION**

Greenerprinter is the first commercial printer in the United States to become a certified "B Corporation"! B Corps are a new type of corporation that use the power of business to address social and environmental



Partners in Sustainability

CASE STUDIES

Learn what companies like Clif Bar, SVN, Annie's, and others are doing to "Green their printing."



SEPTEMBER SALE

15% OFF
brochures,
sell sheets,
multi-page items
thru September 30th



REQUEST SAMPLES

Custom Inks?
Diecutting?
Special bindery?
WE DO IT ALL!

CUSTOM QUOTE

NOW AVAILABLE:

business cards
bookmarks
cards
folders

DE

Printers "Going Green"

ENVIRONMENTAL CERTIFICATIONS, MEMBERSHIPS & CREDENTIALS



Printers "Going Green"

GREEN YOUR PRINTING



GETTING STARTED

Why print green? For starters, the environmental benefits are significant: In 2008 alone, we saved nearly 6,000 trees and over 1.8 million gallons of water! ([read more](#))

DESIGN

The importance of design in green printing cannot be underestimated. After all, as printers, we will work with the files and specifications that you provide to us... ([read more](#))

PAPER

One of the biggest reasons to green your printing is to reduce your paper footprint. Since every sheet of non-recycled or virgin paper comes from forests... ([read more](#))

INKS

Until recently, the printing industry has used petroleum-based inks, which have two primary environmental drawbacks. First, they are made using a non-renewable resource... ([read more](#))



Printers “Going Green”



- Everyboy talks about **printing**, but **what about the prints?**

Where does the paper go?

GARBAGE (BLACK) SIDE

These are made with two different materials and are not recyclable. Place all of these items as well as regular refuse in the Black side of your split container:

- Candy Wrappers
- Cardboard Roll with Plastic
Wrap attached. *Remove the plastic wrap, both are recyclable.*
- Ceramics
- Clothes
- Diapers - clean or dirty
- Disposable Plastic Cups
- Dryer Lint
- Fabric
- Foil Pouches or Coated Paper
Example: flavored drinks, Capri Sun
These are made with two different materials and are not recyclable.
- Food Scraps
- Juice Boxes *Example: 4-packs..Hi C, Juicy, Juicy*
These are made with two different materials and are not recyclable..
- Kitchen Scraps
- Light Bulbs
- Milk Cartons
Mirrors - These are made with two different materials and are not recyclable.
- Old Shoes
- Plastic Grocery Bags - dirty
- Plastic Knives & Forks
- Paper Plates - dirty



RECYCLE (GREEN) SIDE

Place all of these items in the Green side of your split container:

PAPER - (Exception: paper with a waxy or foil coating)

- Office Paper - staples are okay (*remove paper clips*)
- Cardboard Boxes - flatten boxes
- Catalogs
- Chipboard Boxes - flatten boxes
Example: pen, cracker, cereal, crayon, detergent boxes
- Computer Paper
- Gift Boxes - flatten boxes
- Junk Mail
- Magazines
- Newspapers
- Paper Bags
- Paper Egg Cartons
- Pizza Boxes - must be clean
- Post-It Notes, Poster Board, etc.
- Shredded Paper - place into bags and seal
- Shoe Boxes - flatten boxes
- Telephone Books

CANS - rinse containers

- Aluminum Cans
- Aluminum Foil - Clean
- Steel/Tin Cans - *Ex: soup, vegetable, fruit, or pet-food cans*

GLASS - remove lids and rinse containers

Glass Bottles - *remove lid (recyclable) and rinse*
Example: Juice, Tea, Beer, Wine, colored-glass bottles

Glass Jars - *remove lid (recyclable) and rinse*
Example: applesauce, pasta sauce, or salsa jars

PLASTIC - rinse containers or bags

- Dry Cleaning Bags
- Narrow-necked Plastic Containers

Paper is a sustainable product

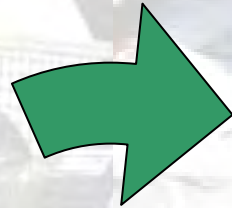
- Paper comes from renewable resources
- not only wood,
- also the “urban forest”
- recycling saves $> 60\%$ of the energy and water compared to fresh fiber
- newsprint from 100 % recovered paper in Europe

The Paper Loop

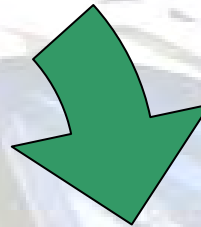
Fresh fiber



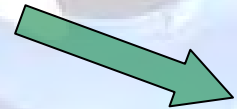
**Newspaper,
magazine paper**



Printing



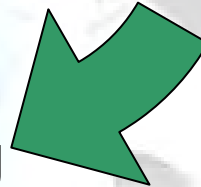
Collection



Landfill



Packaging



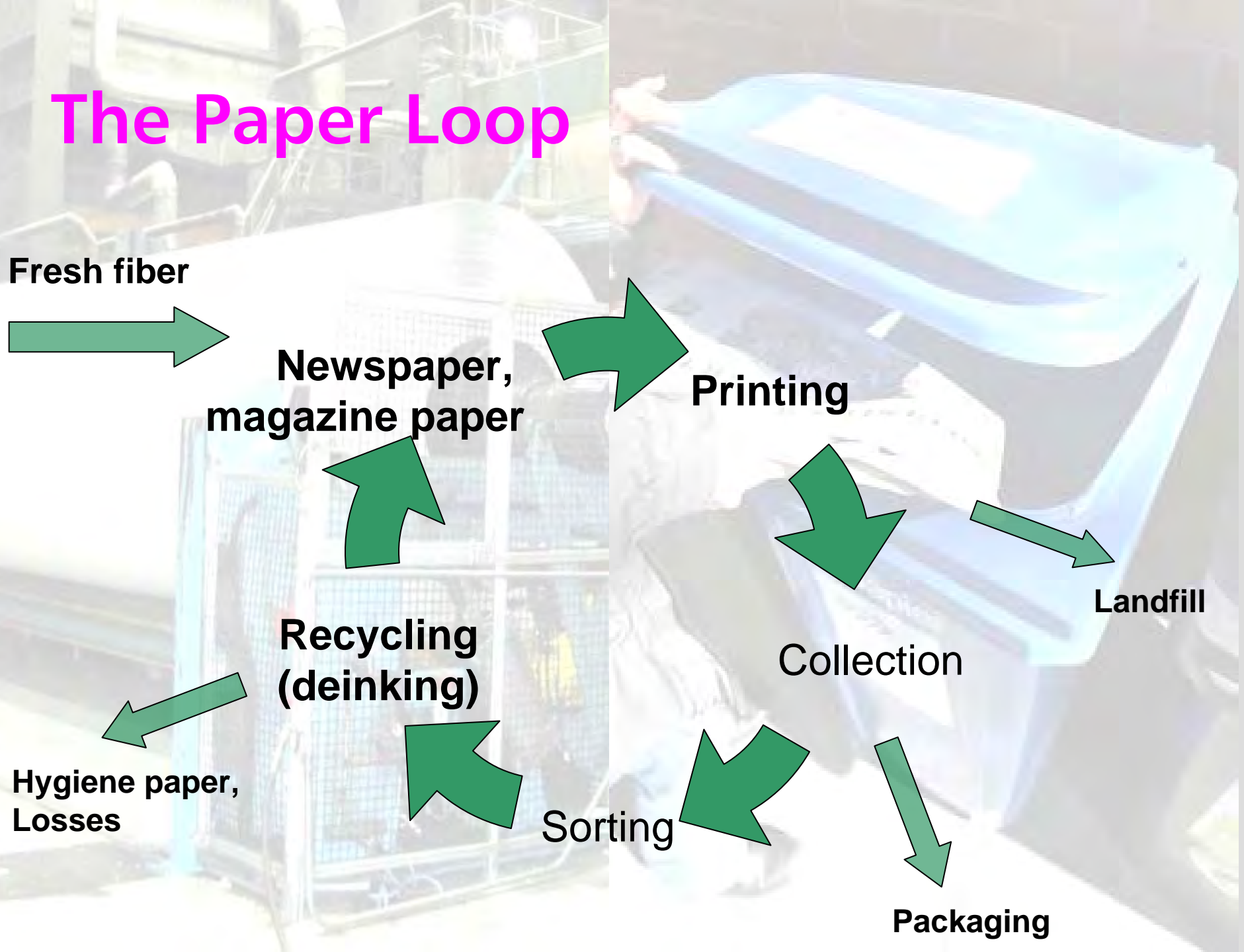
Sorting



**Recycling
(deinking)**



**Hygiene paper,
Losses**



How paper recycling works

- Paper is collected
- Sorted – automatically & by hand
- Paper for deinking has to be free of impurities such as undeinkable papers and board (deinking = removal of ink)
- Neither machines nor workers can separate different printing processes (flexo, inkjet from offset)

Paper Recycling Process: Sorting



Paper Recycling Process: Sorting







Printers “Going Green”



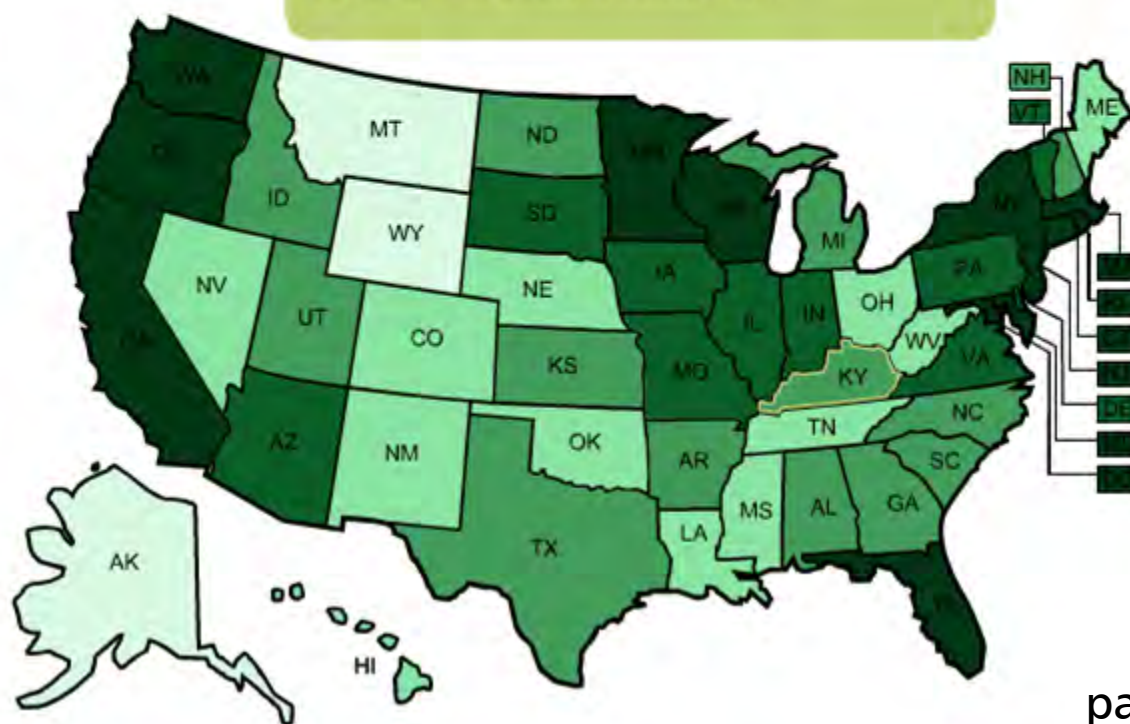
- Everyboy talks about **printing**, but **what about the prints?**

Paper Recycling in the US

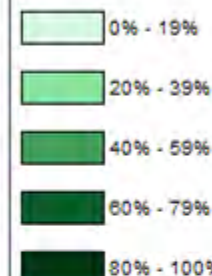
paper/paperboard collection by state, population (millions)

Kentucky:

Population with access to Curbside (in millions): 1.0
Population with access to Drop-Off (in millions): 1.7
Population with access to Curbside: 55%



percentage with access to curbside recycling



For additional information on the 2007 AF&PA Community Survey, please [click here](#).

Paper Recycling in the US and Europe

Recycling Rate 2008

The recycling rate in Europe reached 66.6%¹ in 2008. The total amount of paper collected and sent to be recycled in paper mills came to 60.3 million tonnes, an increase of 8.2 million tonnes (or +15.8%) since 2004, the base year for the target the industry has set itself for increasing recycling in Europe.

cepi.org

paperrecycles.org

did you know...

- By 2012, the paper industry hopes to recover 60 percent of the paper Americans consume.
- In 2008, total paper recovery averaged 340 pounds for each man, woman, and child in America.
- Newspapers are recycled into other products such as cereal boxes, egg cartons, pencil barrels, grocery bags, tissue paper, cellulose insulation materials, and many more diverse products.

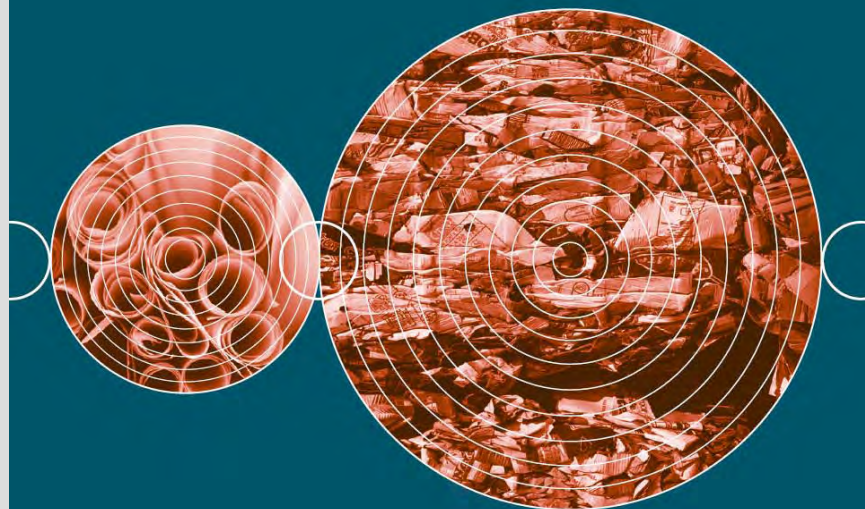
Communication of INGEDE

- INGEDE is the organisation of the deinking mills
- Communication contacts exist to all major stakeholders in the paper value chain and to their suppliers
- An important committee is the European Recovered Paper Council (ERPC), the group of signatories and supporters of the European Declaration on Paper Recycling (overleaf)

European Declaration on Paper Recycling

European Declaration on Paper Recycling
2006 - 2010

**The “Declaration” is an important self-commitment
of the paper value chain**



**More information and download from
www.paperrecovery.org**

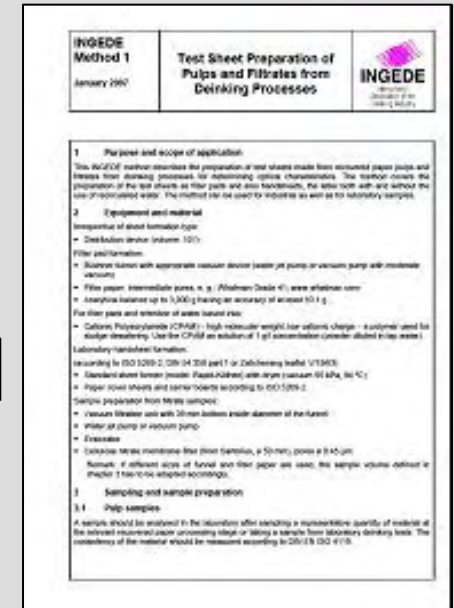
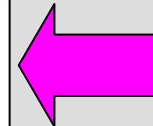
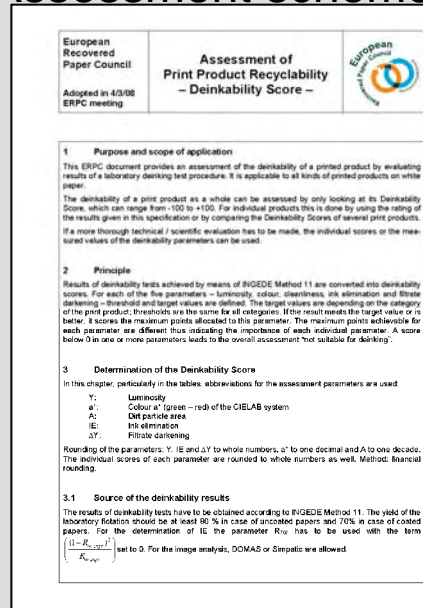
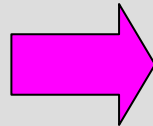
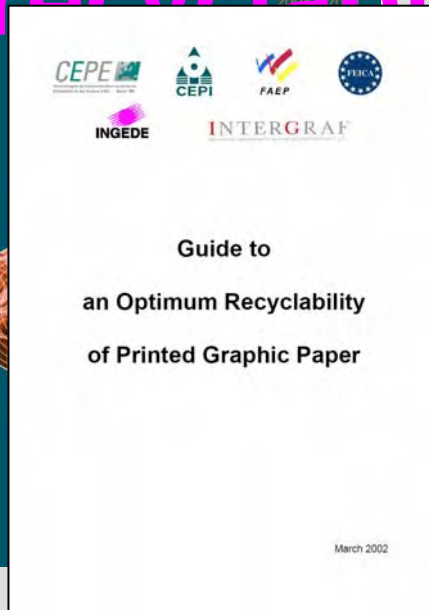
European Declaration on Paper Recycling

European Declaration on Paper Recycling
2006 - 2010

- **Target recycling rate: 66 ± 1.5% by 2010**
achieved in 2008: 66.6%
- Qualitative targets for recyclability and paper collection systems
- **Seven associations from paper & converting industry, printing, recovered paper trade**
- **Seven associations of the publishing sector and of suppliers to printers & converters**
- **The EU acts as observer**

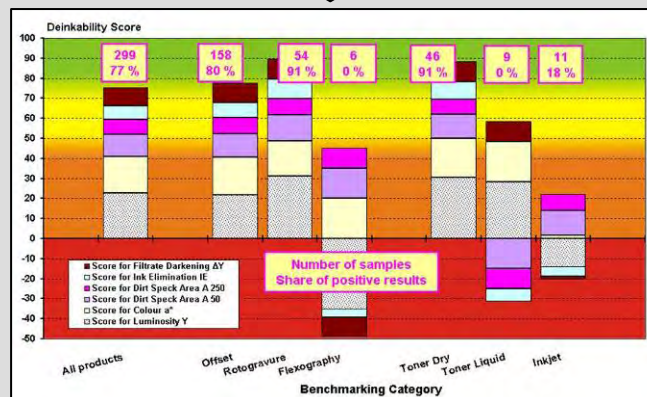
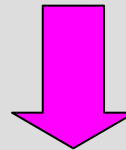
INGEDE activities to improve recyclability

Assessment schemes



Commitments

Research, test methods



Recyclability surveys and research projects

INGEDE activities to improve recyclability

- The **European Declaration on Paper Recycling** acts as an umbrella document
- **Guidelines** provide more technical details
- **Test methods**,
e. g. **INGEDE Method 11** for deinking tests
- Assessment scheme ("**Deinking Scorecard**")
adopted by the ERPC
- INGEDE issues **certificates**
based on this assessment

Deinkability Scorecard

| | | |
|---|---|---|
| <p>European Recovered Paper Council</p> <p>Adopted in 4/3/08 ERPC meeting</p> | <p>Assessment of Print Product Recyclability – Deinkability Score –</p> |  |
|---|---|---|

1 Purpose and scope of application

This ERPC document provides an assessment of the deinkability of a printed product by evaluating results of a laboratory deinking test procedure. It is applicable to all kinds of printed products on white paper.

The deinkability of a print product as a whole can be assessed by only looking at its Deinkability Score, which can range from -100 to +100. For individual products this is done by using the rating of the results given in this specification or by comparing the Deinkability Scores of several print products.

If a more thorough technical / scientific evaluation has to be made, the individual scores or the measured values of the deinkability parameters can be used.

2 Principle

Results of deinkability tests achieved by means of INGEDE Method 11 are converted into deinkability scores. For each of the five parameters – luminosity, colour, cleanliness, ink elimination and filtrate darkening – threshold and target values are defined. The target values are depending on the category of the print product; thresholds are the same for all categories. If the result meets the target value or is better, it scores the maximum points allocated to this parameter. The maximum points achievable for each parameter are different thus indicating the importance of each individual parameter. A score below 0 in one or more parameters leads to the overall assessment 'not suitable for deinking'.

3 Determination of the Deinkability Score

In this chapter, particularly in the tables, abbreviations for the assessment parameters are used:

Y: Luminosity

First version adopted in March 2008

Updated version adopted on 17 March 2009

The results of deinkability tests have to be obtained according to INGEDE Method 11. The yield of the laboratory flotation should be at least 80 % in case of uncoated papers and 70% in case of coated papers. For the determination of IE the parameter R_{700} has to be used with the term

$\left(\frac{(1 - R_{\infty, \text{unpr}})^2}{R_{\infty, \text{unpr}}} \right)$ set to 0. For the image analysis, DOMAS or Simpatic are allowed.

Evaluation of deinkability

INGEDE Method 11: Simulation of pulping and flotation

| Objectives | Evaluated Parameters |
|---------------------------------|-------------------------------|
| High Reflection | Luminosity Y of Deinked Pulp |
| High Optical Cleanliness | Dirt Area A* of Deinked Pulp |
| No Color Shade | a* Value of Deinked Pulp |
| High Ink Removal | Ink Elimination IE |
| No Discoloration of White Water | Filtrate Darkening ΔY |

Quality Parameters

Process Parameters

Conversion of the results to a score system

Deinkability Scores: Principle

- Allocation of a **score** for each parameter by
- **Threshold & target values** and the individual results
- Failing to meet thresholds results in **“not suitable for deinking”**
- Meeting or exceeding the target results in **full score** for this parameter
- The total score of all parameters allows an **overall assessment** of a product’s recyclability
- Thresholds are equal for **all product categories**
- Targets depend on the **category of printed product**

Deinkability Scores:

Threshold Values

| Parameter | Y [Points] | a* [-] | A ₅₀ [mm ² /m ²] | A ₂₅₀ [mm ² /m ²] | IE [%] | ΔY [Points] |
|-----------------|---------------|-----------|---|--|-----------|----------------|
| Lower Threshold | 47 | -3.0 | | | 40 | |
| Upper Threshold | | 2.0 | 2,000 | 600 | | 18 |

Y: Luminosity of deinked pulp

a*: Colour of deinked pulp in green / red axis

A₅₀: Dirt particle area of all particles larger than 50 μm

A₂₅₀: Dirt particle area of all particles larger than 250 μm

IE: Ink elimination

ΔY: Filtrate darkening

Deinkability Scores:

Target Values

| Category of printed product | Y [Points] | a* [-] | A ₅₀ [mm ² /m ²] | A ₂₅₀ [mm ² /m ²] | IE [%] | ΔY [Points] |
|-----------------------------------|------------|------------------------|--|---|--------|-------------|
| Newspapers | ≥ 60 | ≥ -2.0 to ≤ +1.0 | ≤ 600 | ≤ 180 | ≥ 70 | ≤ 6 |
| Magazines, uncoated | ≥ 65 | | | | ≥ 70 | |
| Magazines, coated | ≥ 75 | | | | ≥ 75 | |
| Stationery (Y of base paper ≤ 75) | ≥ 70 | | | | ≥ 70 | |
| Stationery (Y of base paper > 75) | ≥ 90 | | | | ≥ 80 | |

Deinkability Scores:

Maximum Score per Parameter

| Parameter | Y | a* | A ₅₀ | A ₂₅₀ | IE | ΔY | Total |
|---------------|----|----|-----------------|------------------|----|----|-------|
| Maximum Score | 35 | 20 | 15 | 10 | 10 | 10 | 100 |

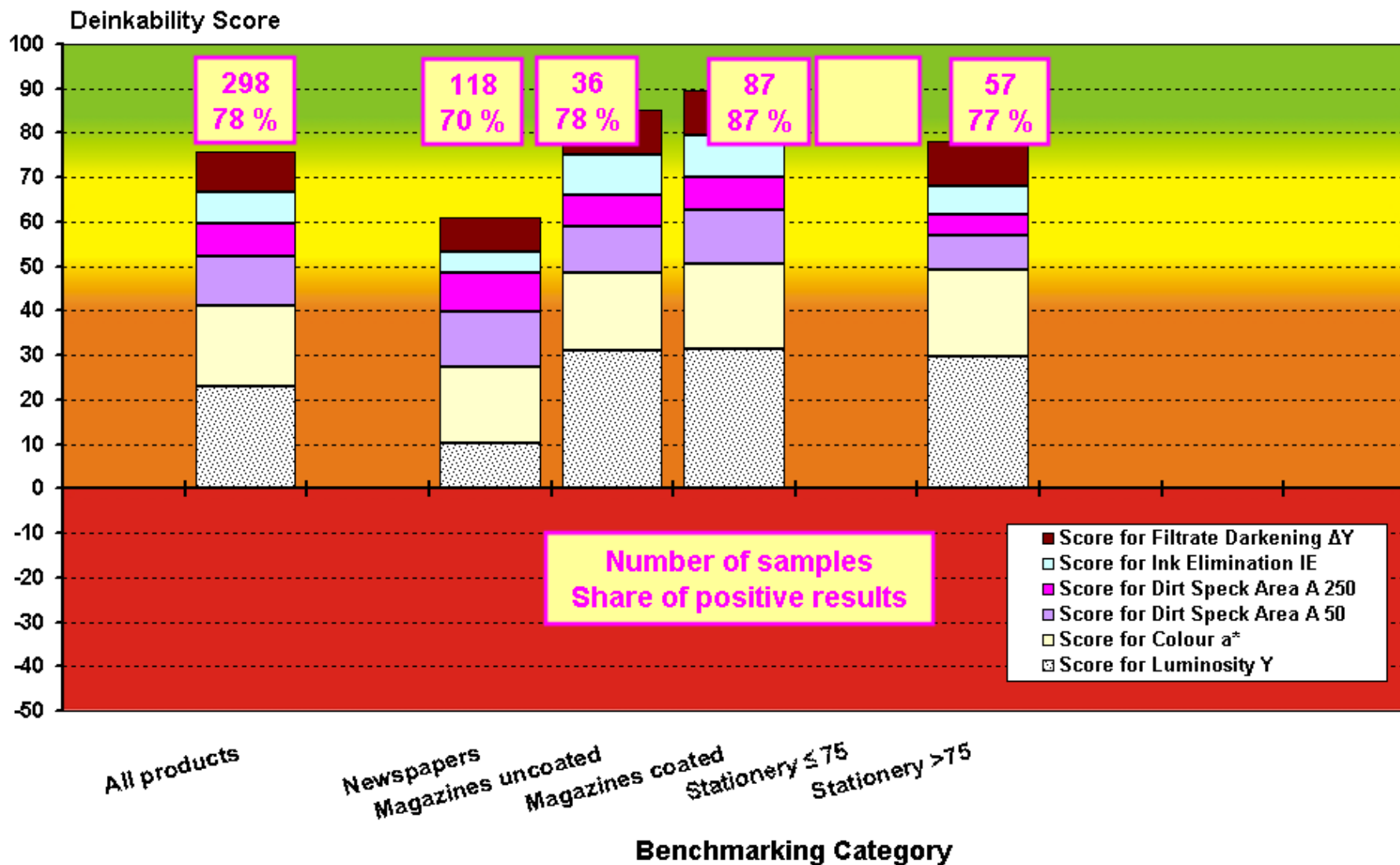
Deinkability Score: Evaluation

| Score | Evaluation of Deinkability |
|---|-------------------------------|
| 71 to 100 Points | Good |
| 51 to 70 Points | Fair |
| 0 to 50 Points | Poor |
| Negative (fails one threshold or more) | Not suitable for deinking* |

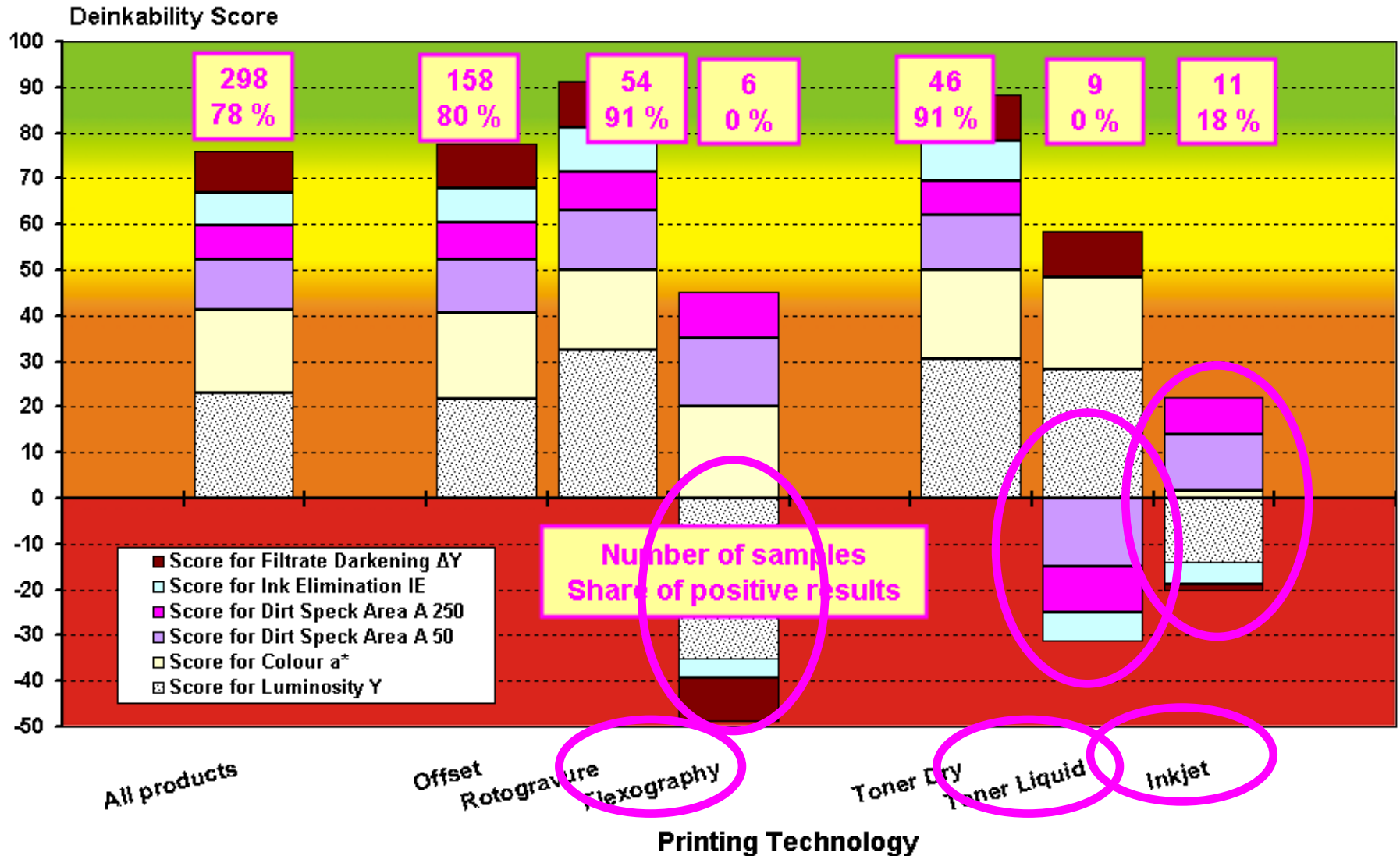
*The product may be recyclable without deinking

Deinkability Scores:

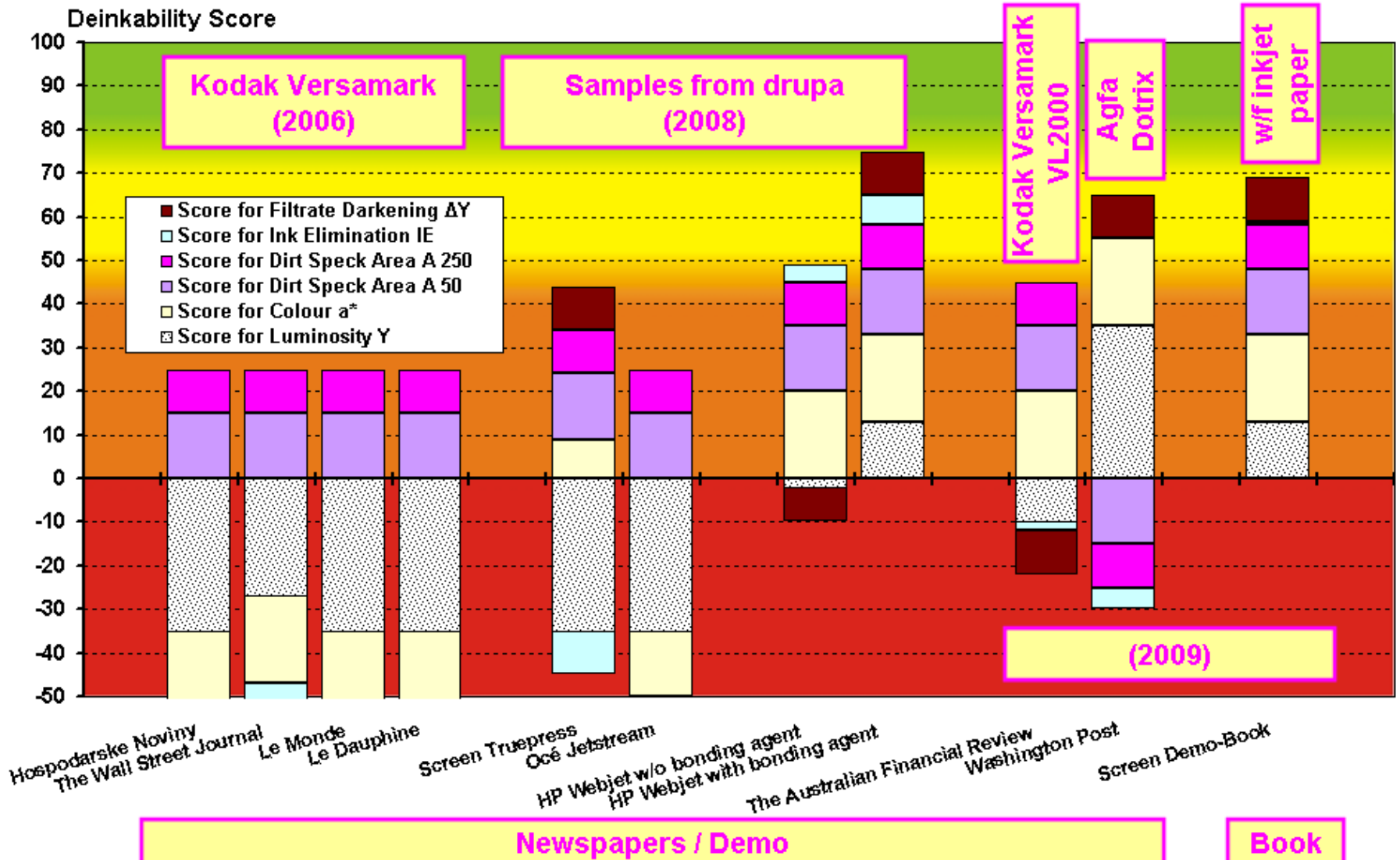
Results by benchmarking category



Deinkability Scores: Results by printing technology



Deinkability Scores: Results of inkjet prints



Printer Manufacturers Going Green

- **Accepting producer responsibility?**
- **Using recyclability for marketing!**
- **Greenwashing?**

Deinkability Test

DEINKING TESTPAGE



*Cum deus tua mens et haec, imperator Caesar, imperio potestatis subie-
torum investigas virtute, summas hostibus stratis triumphis virtutemque tuae
gloriantur et gentes omnes subactas tuum spectantem natum popularique Roma-
nus et senatus liberatus timore amplissimis tuis virtutibus considerique ge-
nerosissimis, non audebam, tunc compatiens, de architectura scripsi et magnas*



*virtutibus replicata edere, metumque
ut non apte tempore interpellans subie-
torum tuae animae offensionem.*

*Cum vero adhibendum te non solum de
vite componi curam, curam publicam-
que rei constitutionis haberi sed etiam de
opportunitate publicorum aedificiorum,
ut scilicet per te non solum provinciae
eius astra, sedam etiam et maritima im-
perii publicorum aedificiorum agrosque
haberet auctoritates, non potui prius
transmittendum, quia prius quique tem-*

*pore de his rebus in te edere, ideo quod prius parenti tua de eo faciam notat
et vix astitit auctoritas. Cum autem consilium auctoritatis in auctoritate innotuisti.*



Color: C10
25% M15
Y15
K2



- unique test pattern
- public domain
- b/w and color
- A4 and letter
- available on INGEDE's website



Certificate



00 Jul 2009

Certificate for the evaluation of the deinkability of a printed product

Certificate No.: 200906 DI XX

Company: **Green Printer Manufacturer**

Printed Product: INGEDE test page, one colour

Printing System: Printer Brand, Number, Specification, Model

Toner System: Dry toner, <<number, specification>>

Paper: UPM Digi Color Laser 90 g/m²

(For further technical details, see data sheet)

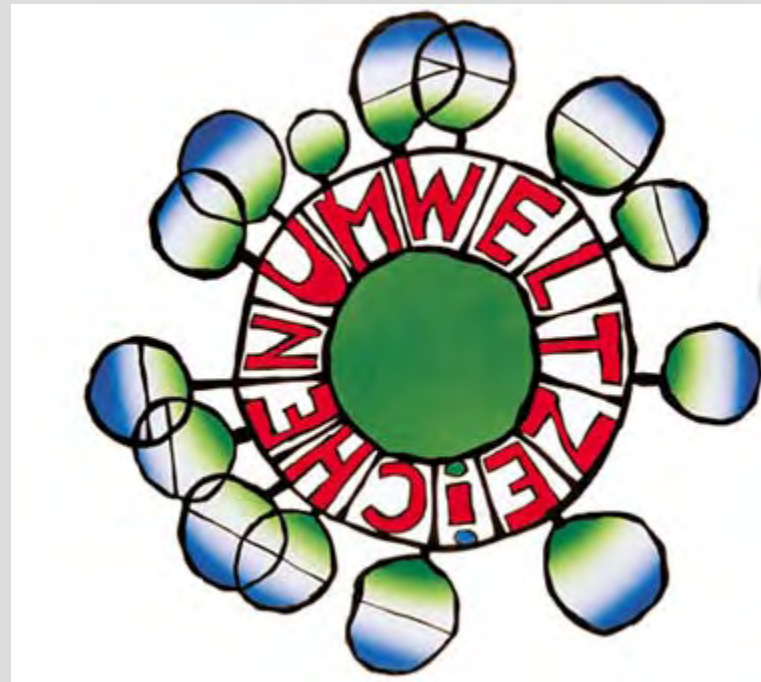
| Hereby we confirm that the tested printed product is deinkable. | | |
|---|-------------|---------------------|
| Evaluation of the Deinkability | good | (top result) |
| Deinkability Scores (total) | 93 | (of 100 possible) |

single results

luminosity Y 28 (of 35 possible)

colour a* 20 (of 20 possible)

Printers Going Green



- Recyclability of printed products

Outlook:

Deinkability of digital prints

- **Dry toners** continue to be good deinkable, even better than offset
- **Liquid toners** remain a problem – not recommended for high volumes as direct mail or advertising
- **Solid ink** is good deinkable now
- **Inkjet** is still a serious problem (water soluble) but might become deinkable now.

Thank you!

- www.ingede.com
- RECOVER

Keep Paper Recyclable!

Paper recycling is not as easy as it was. As e.g. in the UK still five million tonnes of paper are sent to incineration or landfill, the obvious political goal is to recover more paper. But this also requires more effort in keeping the recovered paper free from unwanted materials.

Collect paper separately

Materials Recycling Facilities (MRF) mean a challenge as paper is collected together with other materials that are hard to be separated again. In Germany, the "Bonn Declaration" of paper industry, recycler and municipality organisations clearly voted

against mixing recovered paper with other materials. Experiences from the UK and France confirm this reservation: To achieve consistent quality still a lot of effort is necessary.

Digital challenges

A wide variety of new printing technologies with new ink compositions challenge a process that has been designed to remove offset and rotogravure inks. Even small amounts can spoil a whole load – ten per cent of pigmented ink jet printed paper are enough to ruin the production. Prints coming from HP's Indigo presses are even worse – they must be regarded as unrecyclable. Dry toner based inks do better (page 3).

Who knows? We do!

We are the experts in paper recycling – every day

Waterbased inks – that sounds good. It sounds good for the environment. But who knows that conventional waterbased inks – as they are used in flexo newsprint or in ink jet printing – cannot be removed in the flotation deinking process, the key process in our paper recycling?

Who knows that some digital printing methods are a serious problem for recycling? That certain glues in paper products cannot be removed in our plants? Instead they are leading to tacky depositions in the papermaking process, causing expensive production stops.

Higher quality paper needs a higher quality raw material

INGEDE – the International Association of Deinking Technology – knows about all these problems. Because we together recycle almost ten million tons of recovered paper every year. We want to share these facts with you in order to reach our main target: to keep and improve the recyclability of recovered paper.

No glass, no cans, no milk cartons: in order to keep the high quality of recovered paper, it is necessary to collect recovered paper absolutely separate from other secondary materials! INGEDE even follows up the development of sorting techniques of collected mixed recovered paper, because quality issues are the driv-



Dr. Ulrich Höke is
Chairman of INGEDE

ing force for using recovered paper as fibre source in higher quality paper products, the only potential to increase recycling rates in Europe.

RECOVER will periodically inform you about technological improvements, trends and activities in paper recycling. In this first issue we want to tell you about digital prints, about exemplary paper collection in Switzerland with high ambitions (page 4) and about the „unknown“ recycling friendly adhesives (page 2). And about the INGEDE Seminar that we plan for September in London.

Recycling depends on the quality of recovered paper, because the higher the quality demands of the end product, the higher the quality of the raw material (the recovered paper) must be!

A high level of paper recycling has already been reached: Let's even try better for a sustainable future with paper recycling in Europe.

INGEDE

RECOVER

