2nd Annual Meeting
"Sustainable food packaging"
May 27th , 2025

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hubergroup: sustainable packaging solutions

The ink perspective

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hubergroup company

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Experience	**260-years history in inks and coatings**
Revenues	**Turnover of 743 million € (2024)**
Solutions	**Focus on chemicals and printing ink solutions**
Production	**175 thousand tons (2024)**
Organization	**More than 3500 employees in 28 countries**

hubergroup Italy S.p.A.

Mother plant of solvent-based inks	
Location	Bolzano Vicentino (VI)
Revenues	> 140 million € (2024)
Production	40 thousand tons of inks (2024)
Organization	> 170 employees

Agenda

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.01 **Printing inks and mechanical recycling**

.02 **Brief summary of regulatory trends**

.03 **hubergroup solutions**

.04 **Key messages**

Printing inks and mechanical recycling

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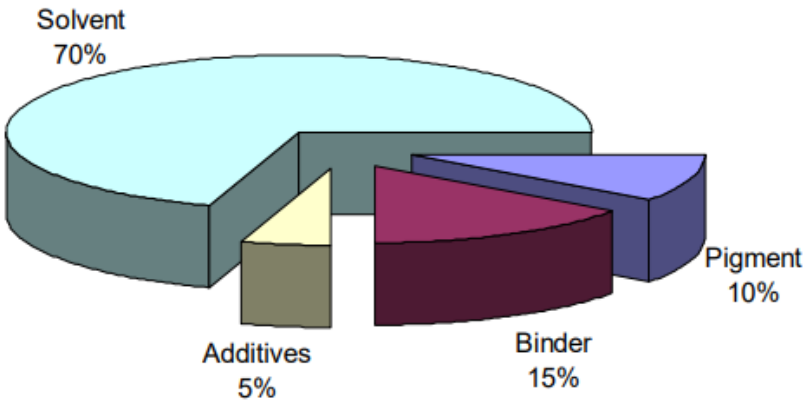
Ink composition: status quo



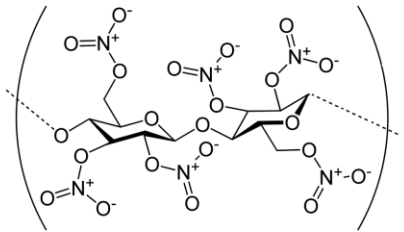
- **Solvent**-based inks
- **Flexo** and **Gravure** printing
- After printing/drying, two major components left: **pigments and binders**

Binders and pigments in flexible packaging

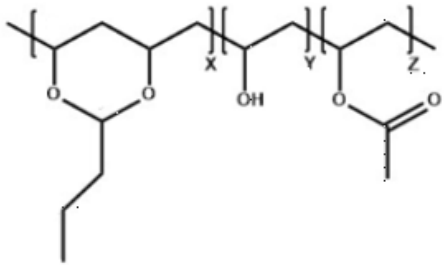
BINDERS	
📌 **Flexo printing**	90% **NC**
📌 **Gravure printing**	75% **NC**
	25% **PVC**,**PVB**, **PU**
📌 **Gravure surface printing**	90% **NC**

PIGMENTS	
📌 **Inorganic**	Titanium dioxide (TiO_2)
📌 **Organic**	Coloured pigments

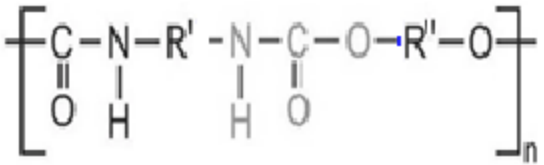
📌 **D4R: PVC** to be replaced by **PU**



Nitrocellulose (NC) structure



Polyvinyl butyral (PVB) structure



Polyurethane (PU) structure

Mechanical recycling: the role of printing inks

- **Challenge:** Inks enablying recycling
- Currently, negative impacts on recycling process
  - No transparent recycled film
  - Stability at high temperature (240-250°C)
  - Volatile breakdown products
  - Impact on organoleptic properties (odour)
  - Mechanical properties degradation

From printed films to recyclates: the NC challenge

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Printed Films: PP,PE

Full surface printed
White pigment: TiO_2

Nitrocellulose (NC)
Polyurethane (PU)
Polyvinylbutyral (PVB)

Mechanical recycling without deinking

Regranulation 240 – 250°C

Regranulates rPP, rPE

Results

NC based binder
- Colour change
- Odour
- Volatiles

PVB based binder
- Colour change
- Slight odour
- No volatiles

PU based binder
- Colour stable
- Odour free
- No volatiles

© PrintCYC

Binder impact

- NC has a negative impact on recyclate quality
  - Colour change
  - Sensorial properties
  - Properties of recycled film

- PU and PVB have a better compatibility with mechanical recycling

- Vinyl-based binders (PVC) are regarded as non-compatible with mechanical recycling

- Confirmed by investigations from Ceflex, RecyClass

Brief summary of regulatory trends

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Packaging sustainability

EU legal perspective new PPWR

Recycling targets

- By 2030 all packaging placed on the market has to be recyclable:

  Trend to mono-materials

- By 2035 all flexible packaging has to achieve a 55% recycling rate (“recycling at scale”)

  Recycling infrastructure required

Recycled content targets

Type of packaging	Min. recycled content		Description
	2030	2040	
Contact sensitive packaging (except PET and single-use plastic bottles)	**10%**	**25%**	food packaging!
All other plastic packaging	**35%**	**65%**	non-contact-sensitive
Contact sensitive packaging PET based (except single-use beverage bottles)	30%	50%	food packaging!
Single-use plastic beverage bottles	30%	65%	food packaging!

High(er) quality recyclates required

Reminder: Legal background

EU legislation PPWR

- Entering into effect August 12th , 2026

Important Milestones

- By 2030 all packaging need to be recyclable – non-recyclable packaging will be banned

- Specific design for recycling criteria in “Delegated acts” by 1.1.2028

Paving the road to PPWR

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Ink type	German Min Std. (2024)		RecyClass (1/2025)		Ceflex (draft 1/2025)		CEN 18120 Part 7 (draft Q3 2024)	
	PE laminate	PP	PE	PP*)	PE	PP*)	PE	PP
NC (dry binder w/w))	-	-	-	-	<0,8%	<1,3%	-	-
	-	-	<0,8%	<0,8%	<1,3%	-	<0,8%	<0,8%
	> 0%	-	>0,8%	>0,8%	>1,3%	>1,3%	>0,8%	>0,8%
PU (ink w/w)	-	-	< 5%	< 5%	< 5%	< 5%	no threshold given	
			5-7%	5-7%	-	-	-	-
			> 7%	> 7%	> 5%	> 5%	-	-
PVB (ink w/w)	-	-	-	-	< 5%	< 5%	no threshold given	
					-	-	-	-
					> 5%	> 5%	-	-
wb Acrylics (ink w/w)	-	-	-	-	< 5%	< 5%	-	-
					> 5%	> 5%		

- Existing entries are likely to be adopted by CEN
- CEN definitions are will most probably be adopted by PPWR delegated acts

*) Expert opinion, further tests pending

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1. NC calculator

2. NC-free inks

3. Water-based inks

4. Deinking

NC CALCULATION

NC Calculator: a tool for customer requests

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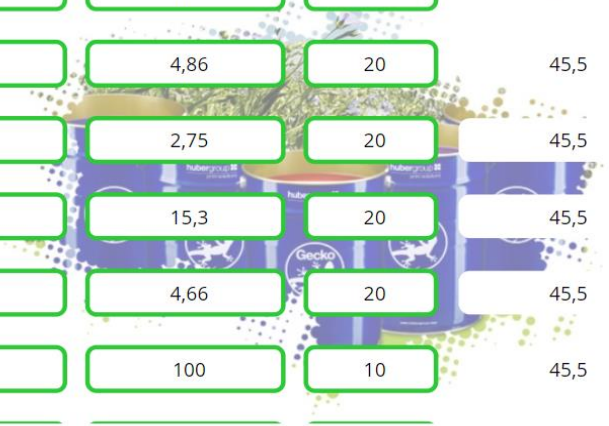
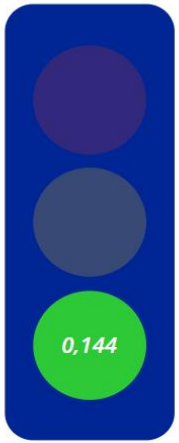
	Color Code	Anilox Volume	Ink Coverage	Dilution	Substrate GSM	
1	MF5-007	6	65,04	20	45,5	0,085
2	GBT Process Bla	6	1,81	20	45,5	0,002
3	GBT Process Cya	7	4,86	20	45,5	0,008
4	GBT Process Ma	8	2,75	20	45,5	0,005
5	P3524	10	15,3	20	45,5	0,033
6	GBT Process Yel	9	4,66	20	45,5	0,01
7	405334	12	100	10	45,5	0





Flexo

Gravure

Reset

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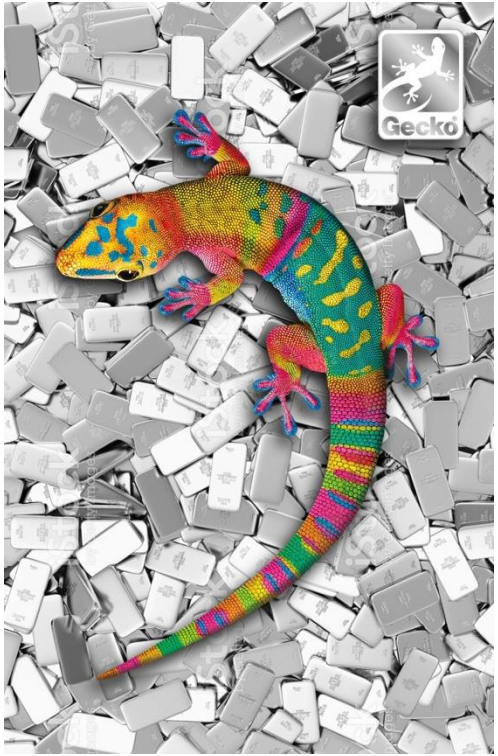
NC-free INKS

- PVC-free and NC-free coloured and whites inks; 1K and 2K overprint varnishes
- Lamination printing
- Surface printing
- Suitable for retort and non retort applications
- Main substrates: polyolefines, PET, OPA
- For flexo and gravure printing; full range of CI
- Monosolvent ink series for solvent recovery



WATER-BASED INKS

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Concentrates

HYDRO X

Extenders

Lacquers

Platform for taylormade product based on customer application and set up

- Flexible packaging lamination
- Flexible packaging frontal
- Paper coated and uncoated
- Corrugated pre/post

DEINKING

Improve recyclate quality from PCW or PIW by washing:

- Remove residual filling good
- Remove inks

Process: Hot washing treatment with hot alkaline solution

- Established cleaning operation for PET bottles
- Method: EPBP QT 507 or APR: 1-2 %NaOH/80-85°C/15 min

  DIN SPEC 91496 Deinking: 1% NaOH, 0,2 %surfactant, 40-80°C, 15 min.

An example of industrial deinking application

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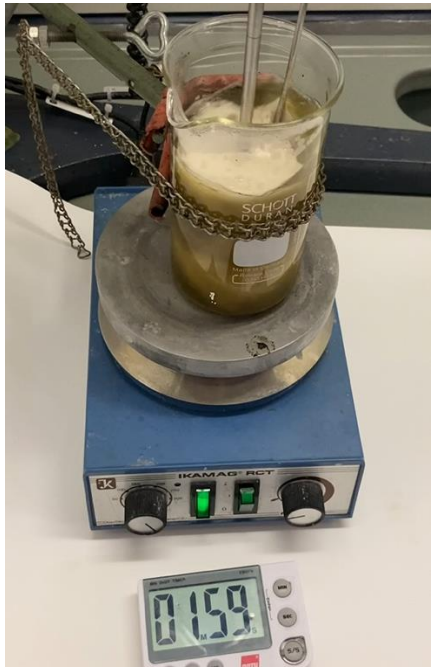
Coldseal adhesive
BOPP Pearl 40 µm
Deinking primer
Ink white
Ink colours
2K Laquer
Coldseal release lacquer (CSRL)

An example of industrial deinking application

Sample preparation

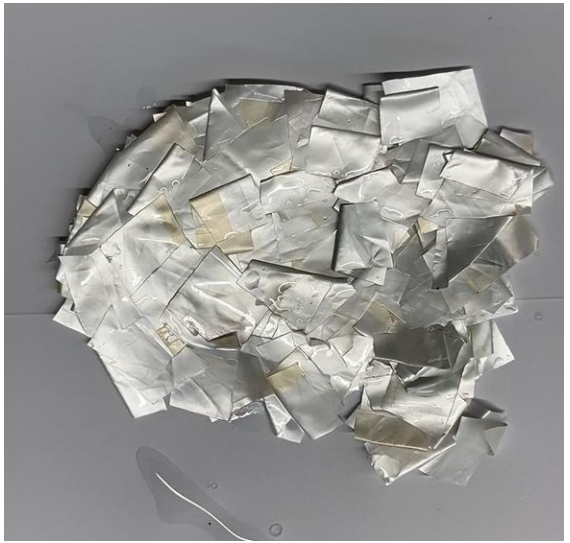


Washing conditions:

1% NaOH

0,2% CTAC

2 min 80°C



Nearly 100% deinking in 2mins

Key message

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Key-message: Inks Facilitate New Packaging Needs

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Mechanical recycling
→ Monomaterial to ensure compatibility with recycling processes

Design requirements
→ Use suitable inks
→ Required appropriate barriers

Printed solutions
→ Deinking solutions
→ Inks compatible with mechanical recycling process

Innovative barriers
→ Oxygen barrier
→ UV barrier

Design for Recycling requires

- the right combination of materials:
  - (monomaterial) films
  - Barrier Coatings
  - Printing inks
- close cooperation across the entire supply chain.

Co-ooperations are needed to establish the best combinations for your applications, ensuring packaging solutions are both sustainable and practical for recycling.

Thank you for your kind attention

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